



SMITH-CORONA SERVICE MANUAL

***ELECTRONIC MULTIPITCH
PORTABLE TYPEWRITERS***

SMITH-CORONA
SCM CORPORATION

PREFACE

This manual provides adjustment information for Smith-Corona Electronic Multi-pitch Portable Typewriters.

The manual is divided into sections that correspond with individual mechanisms of the machine. Thus, there is a Paper Feed Section, Linespace Section, etc. Refer to the Contents page for a listing of subjects covered.

Throughout the manual directional terms such as front, rear, top, bottom, left, right, etc., always refer to the machine as it is used by a typist. Consequently, "right" always refers to the transformer side of the typewriter, regardless of the machine position necessary for checking a requirement or making an adjustment.

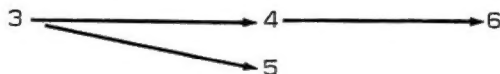
Satisfactory adjustment and performance require that all parts be properly lubricated and their movements be free of binds. Worn or broken parts should be replaced.

GENERAL PROCEDURE: Casing removal is required for access to checks and adjustments. Additional access requirements are noted when applicable.

All adjustments should be checked with Power Cord unplugged unless otherwise specified.

Circled reference numbers (i.e. (8)) in the illustrations indicate adjustment points.

SEQUENCE OF ADJUSTMENTS: Adjustments in each section are consecutively numbered and should be performed in sequence. The first page of every section includes a Branch Display that shows sequence relationships among adjustments. The arrow (→) means "affects." For example:



Read this display as follows: 3 affects 4 and 5. 4 affects 6 but not 5. 5 affects no other adjustment. 6 depends on 4 being correct.

The Branch Displays show adjustment relationships; all adjustments must be correct for proper typewriter performance.



SMITH-CORONA PRODUCT SERVICE
SCM CORPORATION

ELECTRONIC MULTIPITCH PORTABLE TYPEWRITERS SERVICE MANUAL

KEYBOARD MODULE

1. Keyboard

PAPER HANDLING MODULE

2. Paper Feed Adjustments
3. Linespace Adjustments

CARRIER MODULE

4. Carrier Drive Adjustments
5. Print Element Adjustments
6. Print Hammer Adjustments
7. Ribbon Guide Adjustments
8. Cartridge Ribbon Adjustments
9. Correction Ribbon Adjustments

ELECTRICAL/ELECTRONIC

- 0A. Wiring Diagrams
- 0B. Resistance Checks
- 0C. Component Layouts
- 0D. Schematics
- 0E. Wire Routing

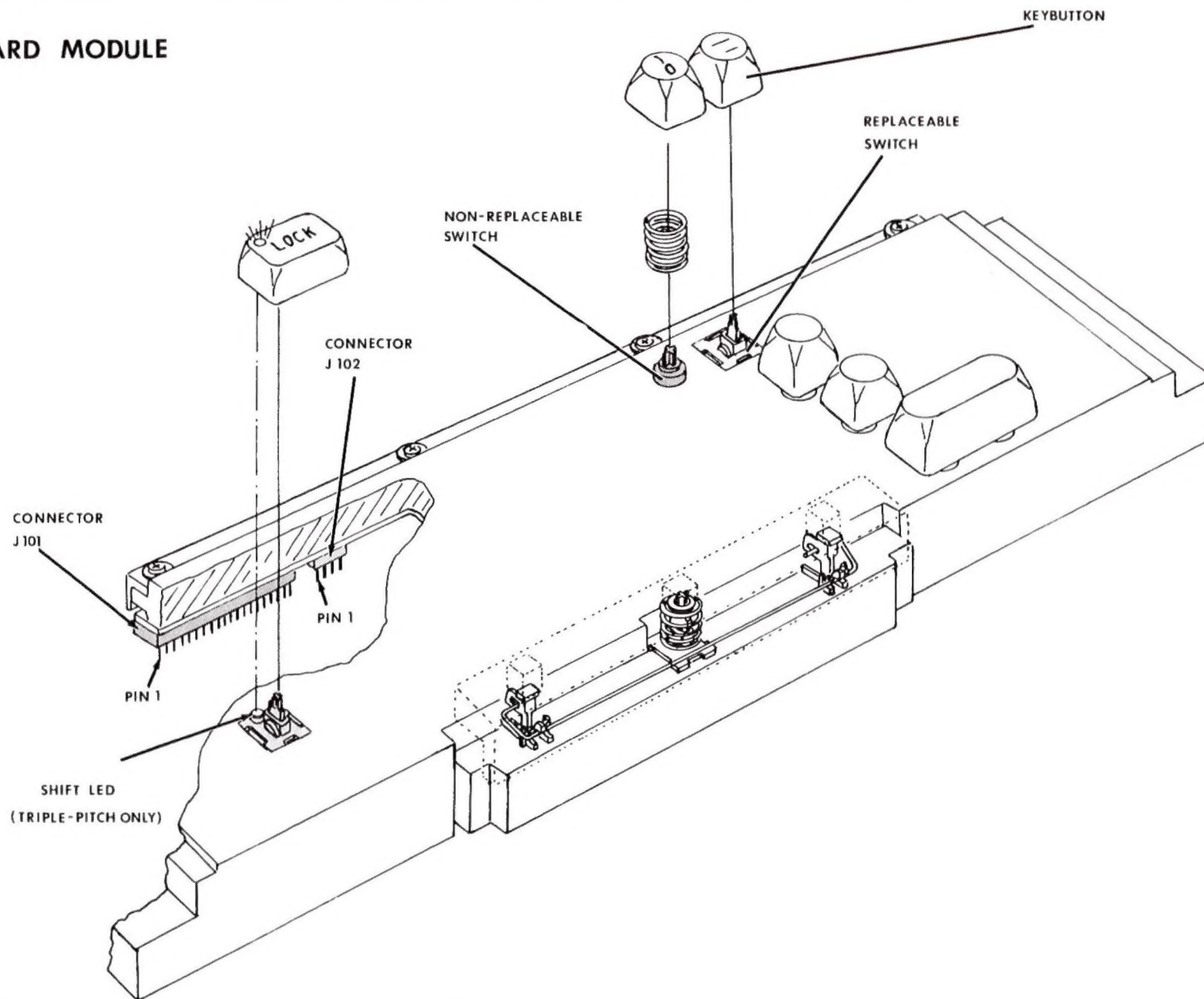
SERVICE PROCEDURES

11. Lubrication
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SECTION 1
KEYBOARD MODULE
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INTRODUCTION AND MAIN DRAWING -----	1-2 & 1-3
KEYBOARD CHART (DUAL PITCH) -----	1-4
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HOW TO CHECK A KEYBOARD SWITCH -----	1-8

KEYBOARD MODULE



INTRODUCTIONKEYBOARD THEORY

Depression of a Keybutton on the Electronic Keyboard closes a switch contact. When closed, the switch contact completes an electrical circuit in a column and row of the Keyboard Matrix. The electronics recognizes the completed circuit, and then processes the information to perform the appropriate function.

Certain Keybuttons of the Dual Pitch Keyboard repeat their function when the Keybutton is held depressed for more than 0.5 seconds. These repeat Keys are identified on the Keyboard Chart for Dual Pitch typewriters.

On the Keyboard Chart for Triple Pitch typewriters, the Keybuttons that repeat their function are identified as Deep Depression Keys. These Keybuttons have two levels of actuation: shallow depression for single action, and deep depression for repeat action. The repeat action in the deep depression mode occurs approximately 0.1 seconds after the key is held down.

SERVICE

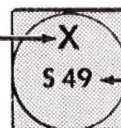
Troubleshooting the Electronic Keyboard requires knowledge of Electrical theory and the use of an ohmmeter. Discret switches and diodes can be replaced. However, the "non-replaceable" key-switches cannot be replaced because it is impractical to separate the PC Board from the Keyboard. In this case, the Keyboard Assembly should be replaced. For information on how to check a key-switch, see page 1-8.

KEYBOARD CHART

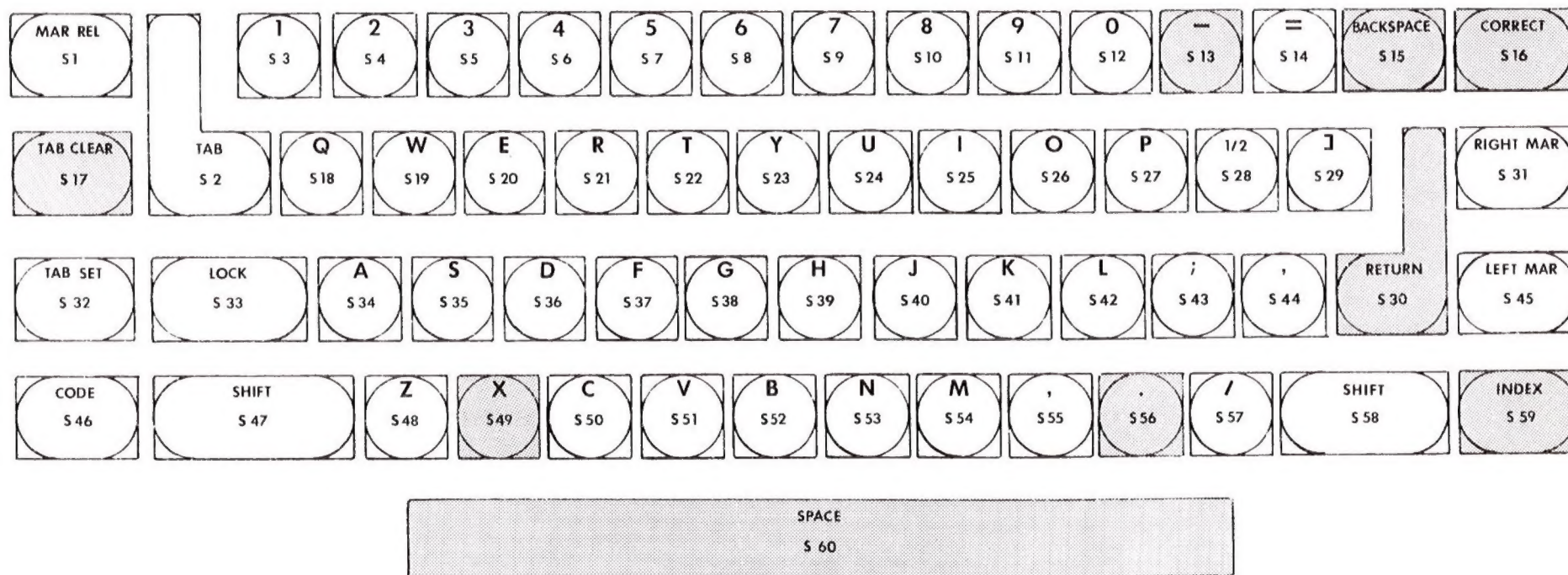
DUAL PITCH

KEYBOARD

CHARACTER OR
FUNCTION ON
1063 KEYBOARD

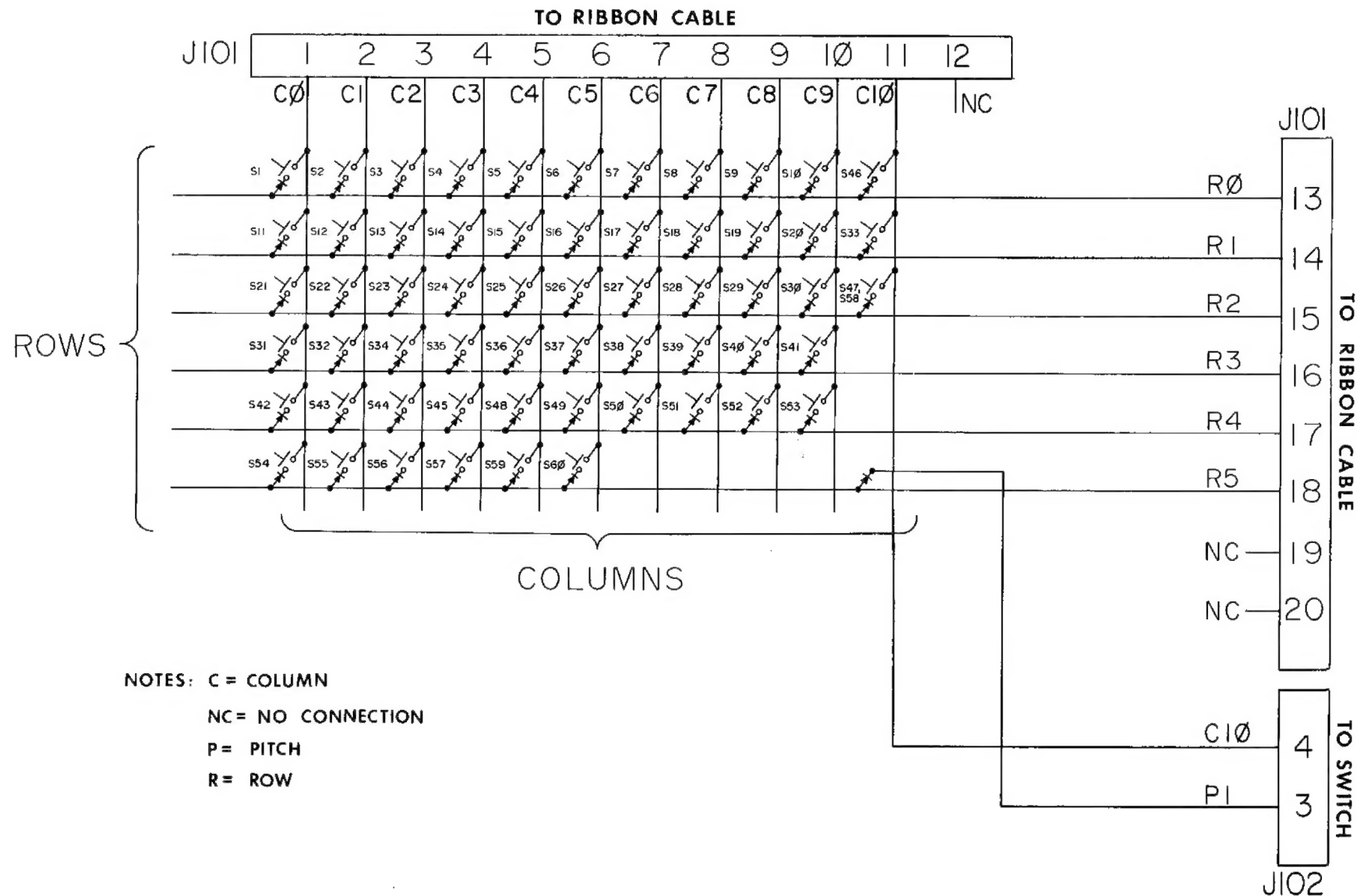


MATRIX POSITION NUMBER



REPRESENTS REPEAT KEYS

DUAL-PITCH KEYBOARD MATRIX

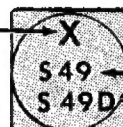


KEYBOARD CHART

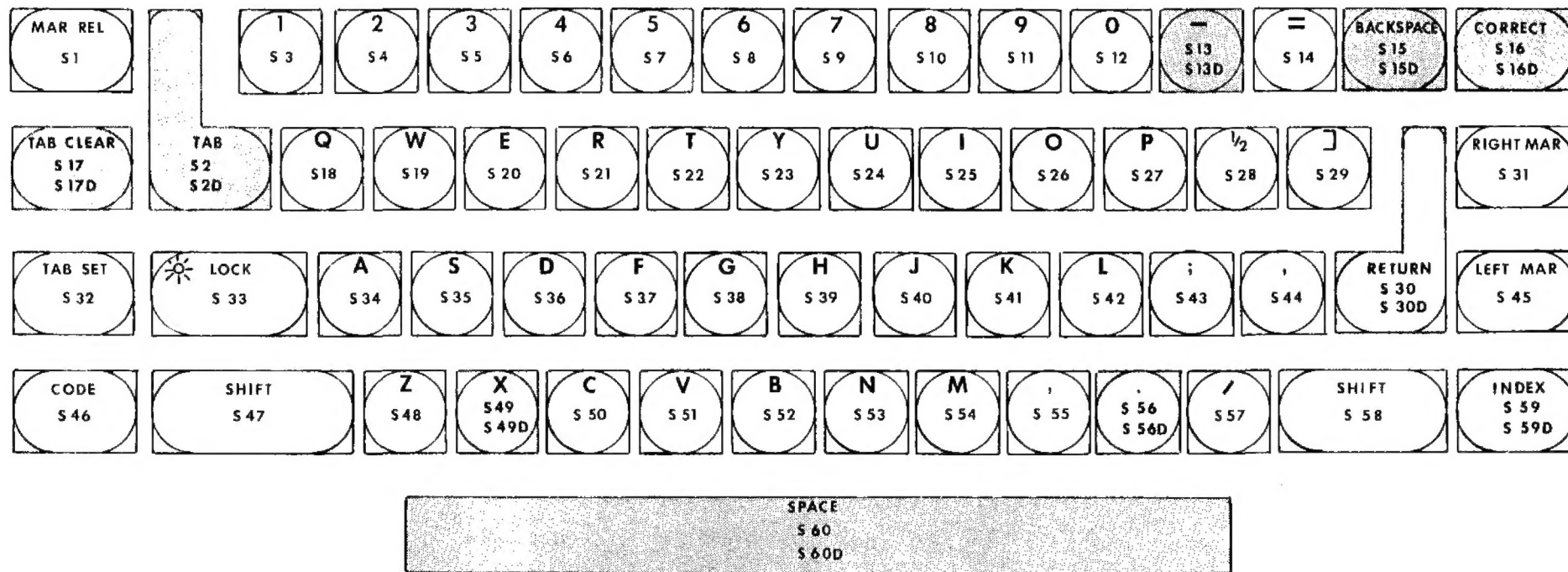
TRIPLE PITCH

KEYBOARD

CHARACTER OR
FUNCTION ON
1063 KEYBOARD

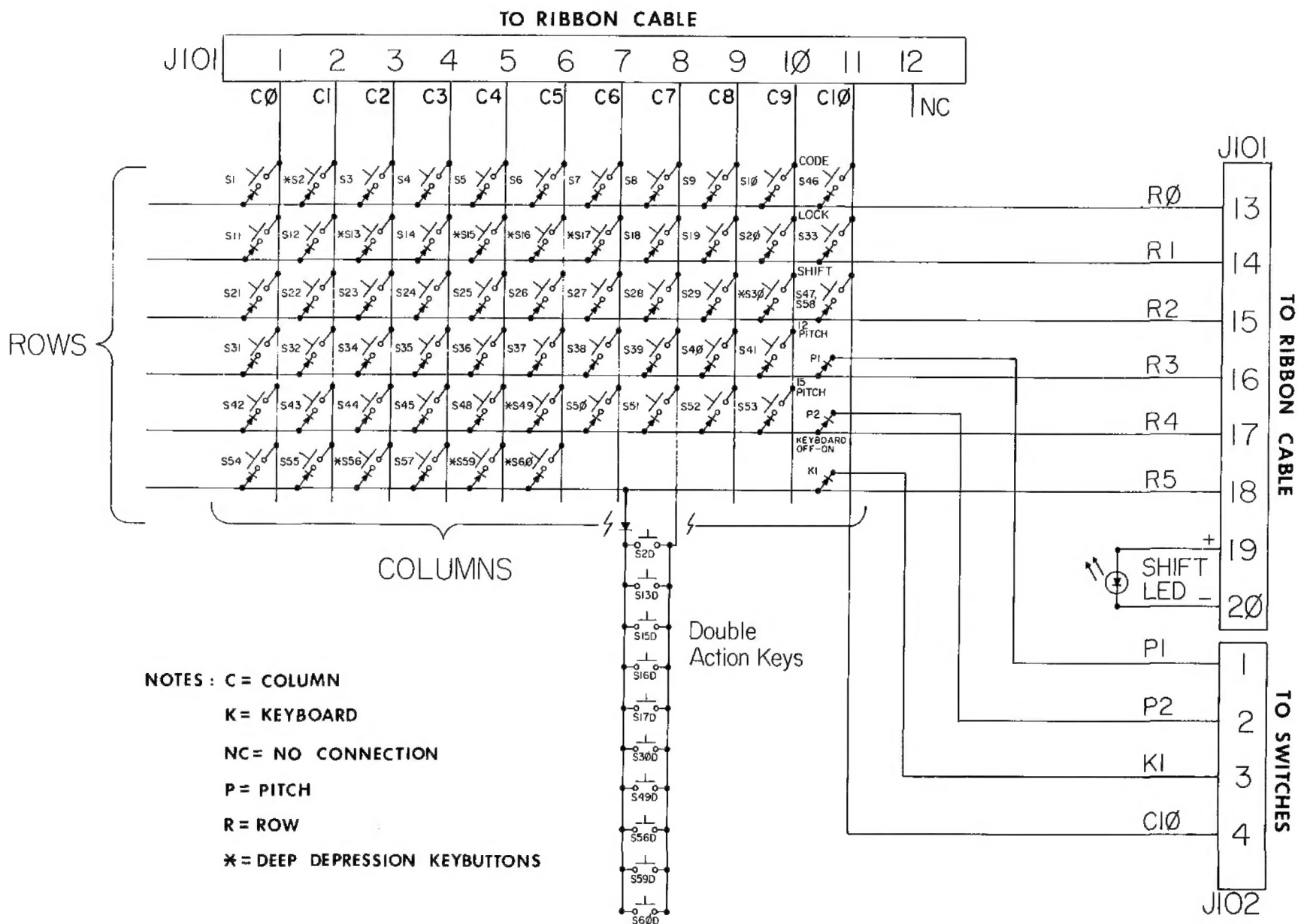


MATRIX POSITION NUMBER
DEEP DEPRESSION KEYS



REPRESENTS DEEP DEPRESSION KEYS

Triple-Pitch Keyboard Matrix



NOTES : C = COLUMN

K = KEYBOARD

NC= NO CONNECTION

P = PITCH

R = ROW

*** = DEEP DEPRESSION KEYBUTTONS**

HOW TO CHECK A KEYBOARD SWITCH

1. Identify the Matrix Position Number for the key from the Keyboard Chart. i.e., The character "r" is matrix position #S21.
2. Identify the column and row for that position from the Matrix Chart; then identify the connector Pin numbers that correspond with the column and row. i.e., S21 is tied to Column Ø and Row 2. Corresponding Connector numbers are J101-pin 1 (for column Ø) and J101-pin 15 (for row 2).
3. Connect the negative potential lead of an ohmmeter to the pin corresponding with the correct column. Then connect the positive potential lead to the pin corresponding with the correct row. (Connecting this way will forward bias the diode in the circuit) i.e., For the character "r," connect the negative potential lead to J101-pin 1, and the positive potential lead to J101-pin 15.
4. Depress the key being checked. If it is a good switch the ohmmeter should indicate less than 1000 ohms resistance. (Readings vary with different meters. To know what your meter should read, take a reading on a similar type known good keyswitch).
5. If the meter indicates an open, check the diode in the circuit. If the diode is bad, splice in a new one. If the diode is good, replace the keyswitch if it is replaceable; the keyboard assembly if it is not.
6. The same check can be performed at the Keyboard input connector (P2) on the Driver/Electronics Board to determine the integrity of the Ribbon Cable and connectors.
7. More than one circuit in the matrix can be completed at one time. i.e., For a capital "R," the "Shift" and "R" circuits of the matrix must be completed. Otherwise, a lower case "r" would be processed by the electronics.

NOTE: Ohmmeters: The black test lead on some ohmmeters is not tied to the negative potential of the meter's power source. i.e., On the Radio Shack (Micronta) Model 22-210A the red lead is tied to the negative potential of the meter. To check the meter's polarity, use a known good diode and check the diode's resistance. The resistance will be the lowest when the cathode (usually marked by a band) is connected to the meter's negative potential.

PAPER FEED ADJUSTMENTS

1

2

3

4

5

6

7

8

9

1. Platen Freeness
2. Height of Paper Feed Rollers
3. Paper Guide Clearance from Platen
4. Paper Table Freeness
5. Functional Check for Equal Feed Roller Tension
6. Rest Position of Paper Bail
7. Alignment of Paper Bail
8. Paper Bail Roller Tension
9. Erasure Table

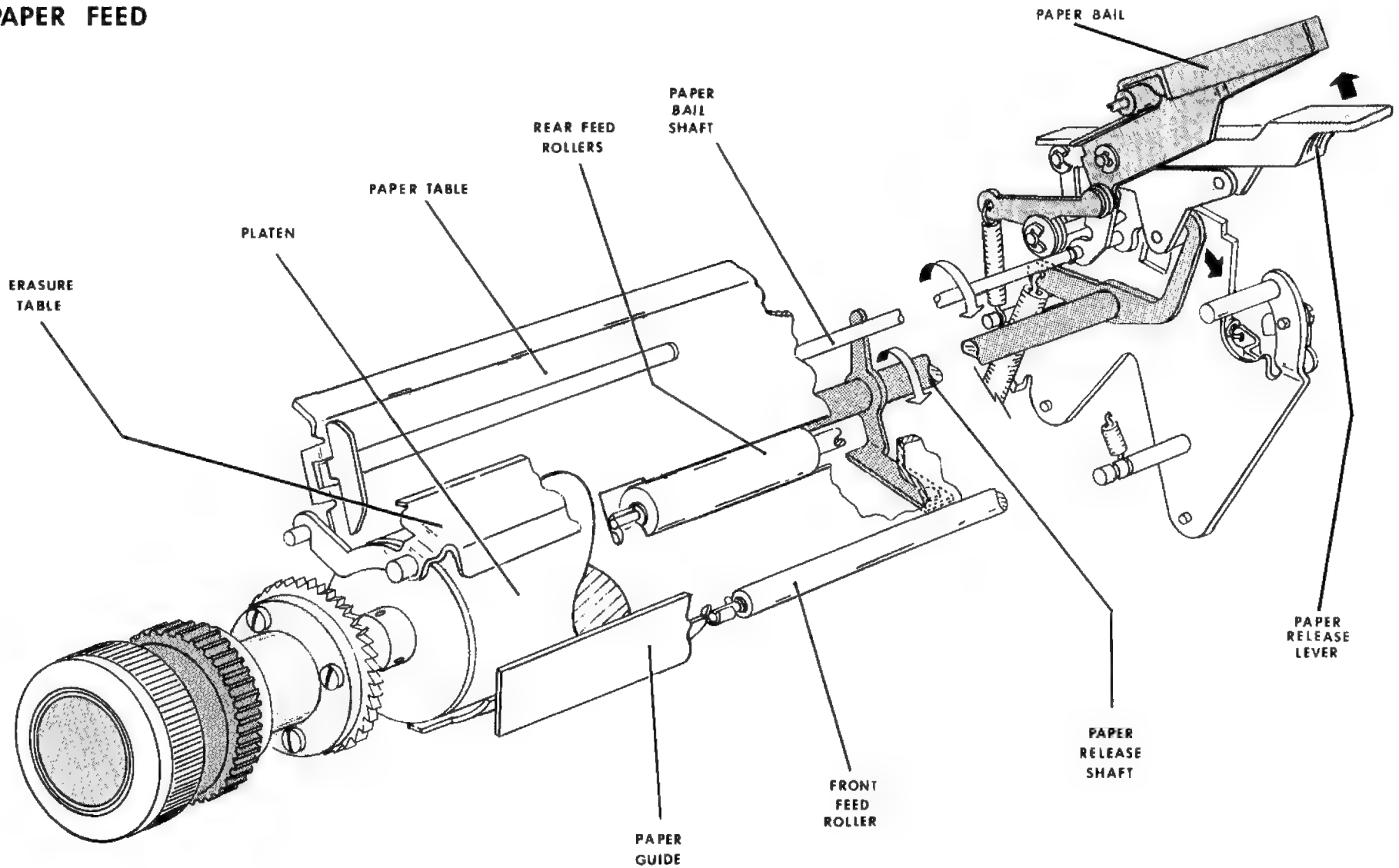
Ribbon Guide
Adjustment #2

Carrier Drive
Adjustments



Circled numbers in the illustrations
indicate adjustment points.

PAPER FEED



1. Platen Freeness

REQUIREMENT:

- A) Platen should be free with maximum of .003" end play.
- B) With Platen pushed to the right to take up end play:
 1. There should be maximum of .003" clearance between RIGHT PLATEN BUSHING (14) and RIGHT PLATEN KNOB HUB (12).
 2. RIGHT PLATEN COLLAR (15) should contact RIGHT PLATEN BUSHING (14).

ADJUSTMENT:

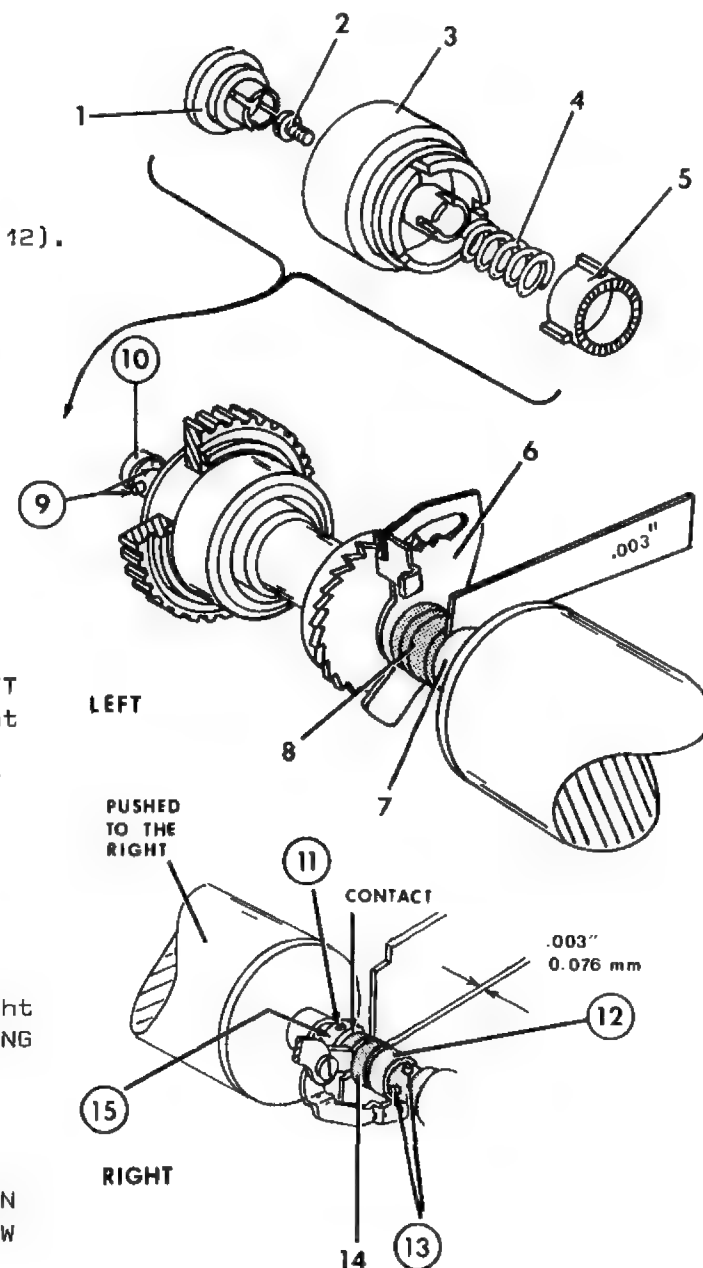
1. Pull off BUTTON (1); remove SCREW (2), LEFT PLATEN KNOB (3), SPRING (4), and VARIABLE DETENT HUB (5).
2. Raise Paper Release Lever. Move Linespace Selector forward to "0" position to relieve Detent pressure on Platen.
3. Loosen FLEXBELT HUB SET SCREWS (9). Loosen RIGHT PLATEN KNOB SET SCREWS (13) and PLATEN COLLAR SET SCREW (11).
4. Insert .003" Shim between LEFT PLATEN BUSHING (8) and LEFT PLATEN SHAFT HUB (7). Push FLEXBELT HUB (10) to the right to take up play, and at the same time push Platen to the left so that Platen HUB (7) is against Shim. Tighten SET SCREWS (9). Remove Shim, and reinstall parts.

NOTE: Make sure that LINESPACE SELECTOR (6) pivots on shoulder of LEFT BUSHING (8). The hex headed Set Screw seats on a flat of the Platen Shaft, and fits in the wide Slot of LEFT PLATEN KNOB (3).

5. Hold Platen to the left to take up end play, and push Right Platen Knob to the left so that HUB (12) is against BUSHING (14). Tighten SET SCREWS (13).

NOTE: One of the two Set Screws should seat on a flat of Platen Shaft.

6. Push Platen to the right to take up end play. Push PLATEN COLLAR (15) against RIGHT BUSHING (14). Tighten SET SCREW (11).



2. Height of Paper Feed Rollers

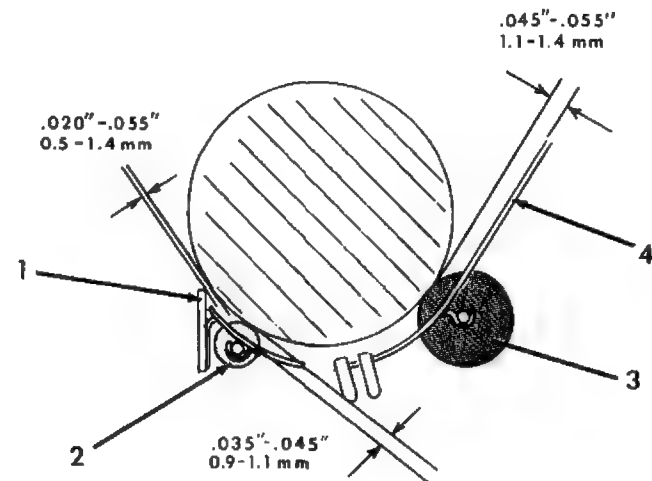
REQUIREMENT:

- A) FRONT FEED ROLLER (2) should extend .035"-.045" above PAPER TABLE (4) at both ends.
- B) REAR FEED ROLLERS (3) should extend .045"-.055" above PAPER TABLE (4) at both ends.

ADJUSTMENT:

Remove PAPER TABLE (4). Form Right and Left FRONT & REAR PAPER TABLE EARS (4-A) & (4-C) up or down.

CAUTION: Feed Rollers must rotate freely.



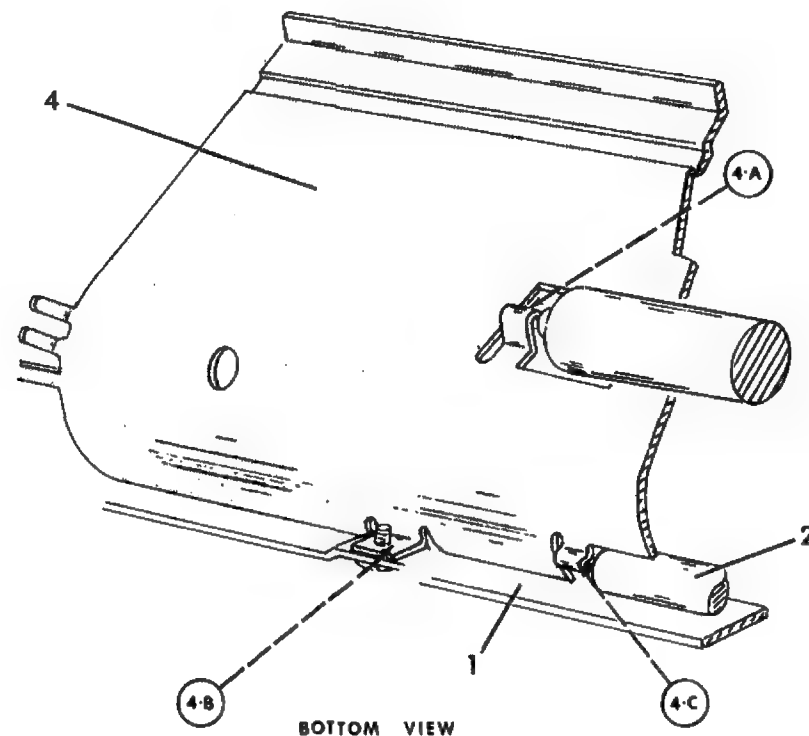
3. Paper Guide Clearance from Platen

REQUIREMENT:

Top edge of PAPER GUIDE (1) should clear Platen by .020"-.055".

ADJUSTMENT:

Form Right and Left PAPER TABLE EARS (4-B) forward or rearward.



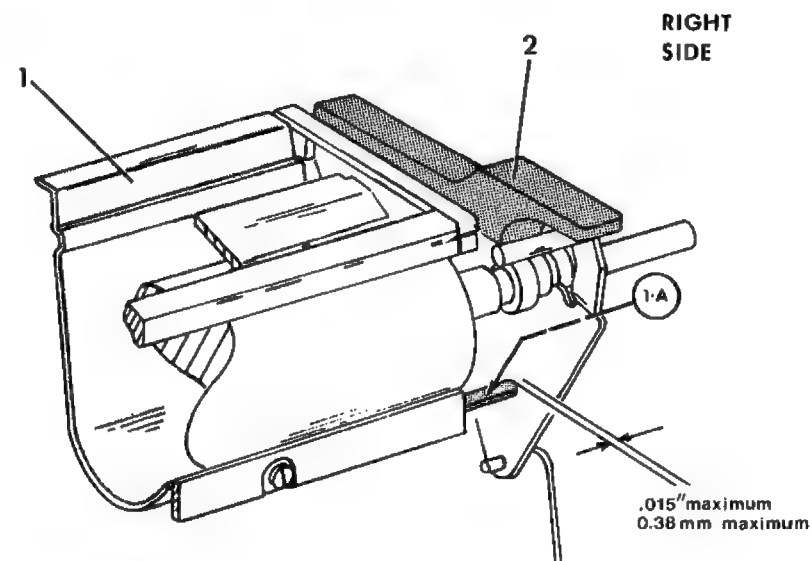
4. Paper Table Freeness

REQUIREMENT:

Right and Left PAPER TABLE ARMS (1-A) should not interfere with free movement of PAPER TABLE (1), and should have maximum of .015" clearance from Platen Frames.

ADJUSTMENT:

Form Right ARM (1-A) up. Form Arm on left side down.



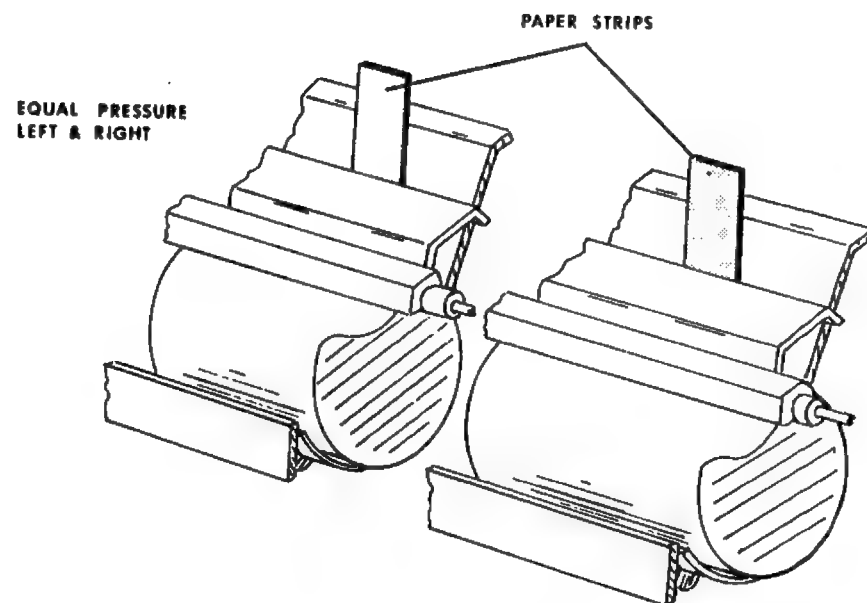
5. Functional Check for Equal Feed Roller Tension

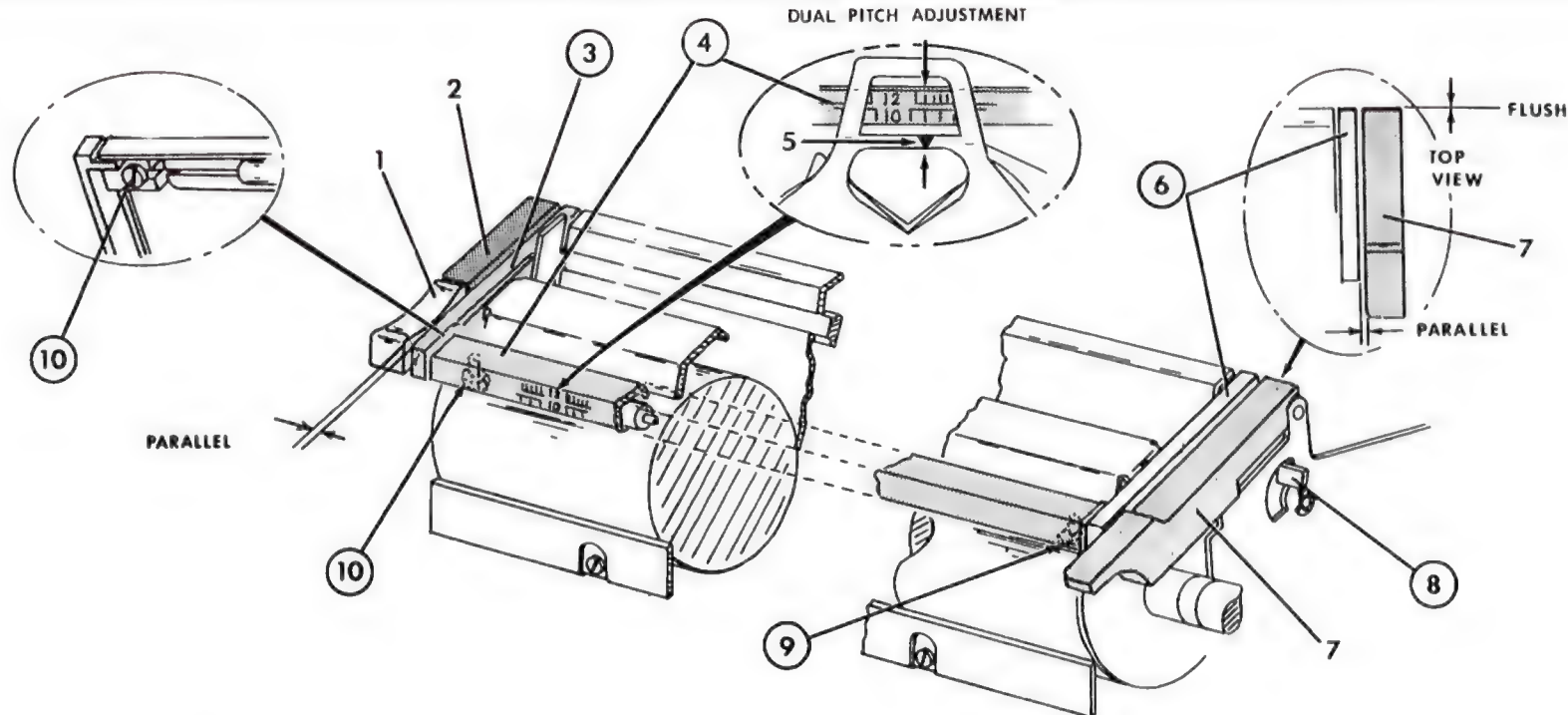
REQUIREMENT:

Outer Rear Feed Rollers should have equal pressure on Platen. Outside edges of Front Feed Rollers should have equal pressure on Platen.

TO CHECK: Insert strips of paper between Platen and outer Rear Rollers. Hold Platen, and alternately pull each strip to check for firm, even tension on both Rollers. Insert paper strips at each end of Front Feed Roller. Hold Platen, and alternately pull each strip to check for firm, even tension at both ends.

CORRECTIVE MEASURE: Check Feed Roller height (Adjustment #2), or replace defective parts.





6. Rest Position of Paper Bail

REQUIREMENT: Rear edge of Right PAPER BAIL ARM (6) should rest flush ($\pm .010''$) with rear edge of PAPER RELEASE LEVER (7).

ADJUSTMENT: Form PAPER BAIL SHAFT ARM (8) forward or rearward.

7. Alignment of Paper Bail

REQUIREMENT:

A) **Dual Pitch Only:** Graduation mark "12" (in 10 Pitch Mode) on PAPER BAIL (4) should align with the Linefinder PRINT POINT POSITION INDICATOR (5) when the Carrier is at the Preset Left Margin.

NOTE: The Linefinder must be aligned correctly before this requirement is checked (Ribbon Guide Adjustment #2).

B) **Dual and Triple Pitch:** Right PAPER BAIL ARM (6) should be parallel with PAPER RELEASE LEVER (7). Left PAPER BAIL ARM (3) should be parallel with Left PLATEN FILLER (2) and LINESPACE SELECTOR BUTTON (1). **NOTE:** This is the only alignment requirement on Triple Pitch machines.

ADJUSTMENT: Position PAPER BAIL (4) and ARMS (3) & (6) with attaching SCREWS (9) & (10) to meet requirements.

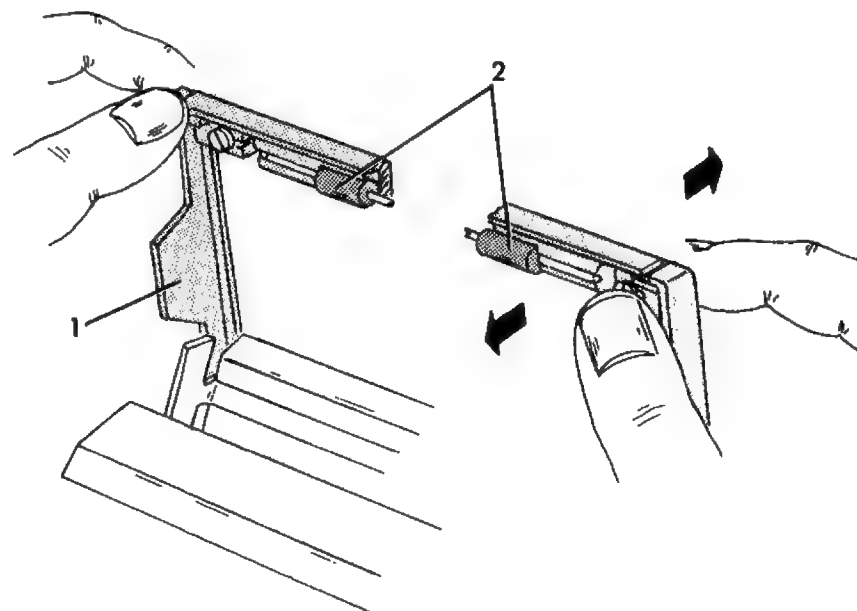
8. Paper Bail Roller Tension

REQUIREMENT:

PAPER BAIL ROLLERS (2) should have equal tension on Platen.

ADJUSTMENT:

Hold one end of PAPER BAIL (1) and form opposite end up or down to parallel Paper Bail with Platen.



9. Erasure Table (Triple Pitch Only)

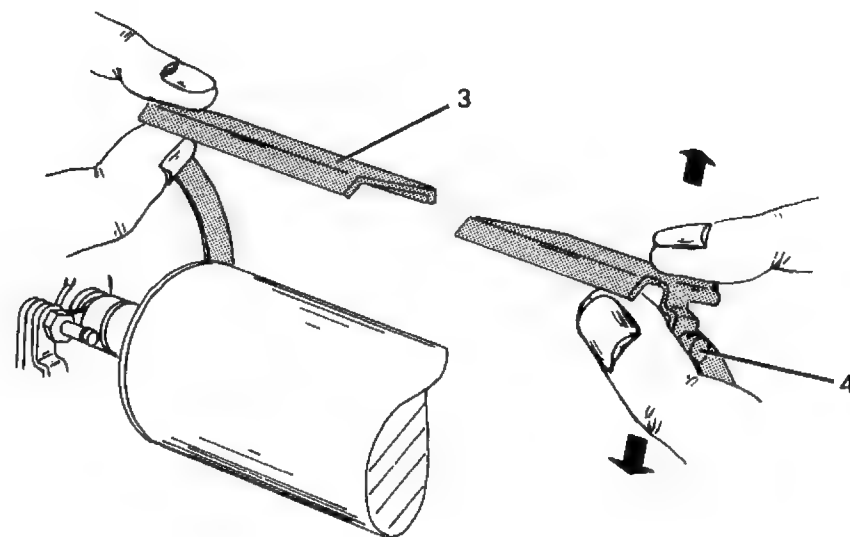
REQUIREMENT:

ERASURE TABLE (3) at rest should be parallel and within .005" clearance from Platen.

ADJUSTMENT:

Hold one end of ERASURE TABLE (3) and form opposite end up or down to parallel Erasure Table with Platen.

NOTE: Erasure Table STUD (4) on right and left sides should not prevent Paper Bail from resting on Platen. If necessary, form Studs.



LINESPACE ADJUSTMENTS

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1. Driver Gear End Play

2. Gear Mesh

3. Linespace Drive

4. Platen Roll

5. Rest Position of Linespace Pawl

6. Linespace Selector Position

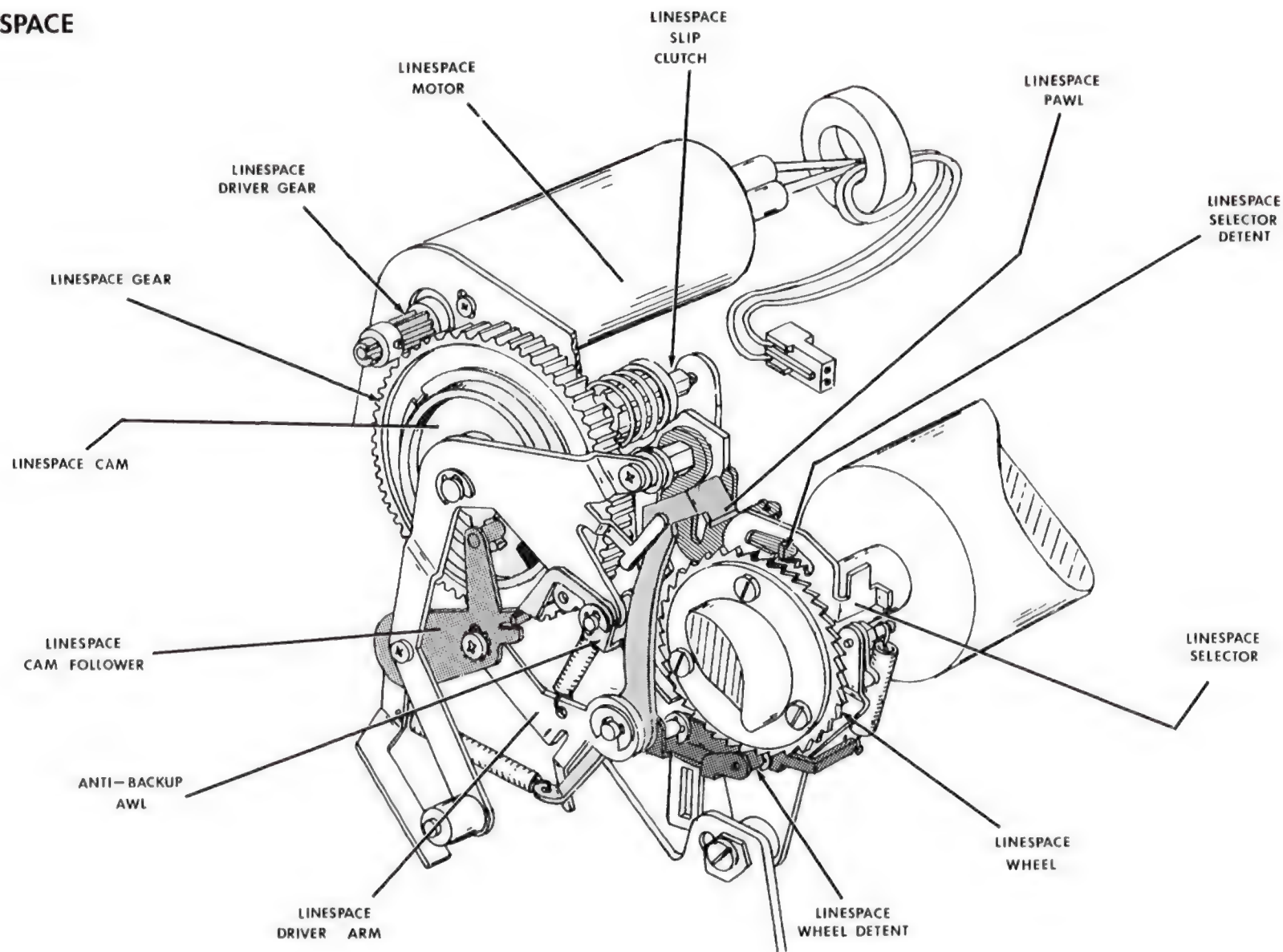
7. Anti-Backup Pawl

8. Linespace Slip Clutch



Circled numbers in the illustrations indicate adjustment points.

LINESPACE



Driver Gear End Play

REQUIREMENT:

In rest position, there should be .015"-.025" clearance between LINESPACE DRIVER GEAR (3) and LINESPACE MOTOR BEARING (4).

ADJUSTMENT:

Loosen COLLAR SET SCREW (2). Insert .020" (0.5mm) Shim between GEAR (3) and BEARING (4). Push COLLAR (1) to the right so that GEAR (3) is against Shim. Tighten SET SCREW (2).

NOTE: When Motor Shaft is pushed to the right, COLLAR (1) should not contact LINESPACE GEAR (8). If necessary, move Collar left on shoulder of DRIVER GEAR (3), but maintain clearance requirement above.

Gear Mesh

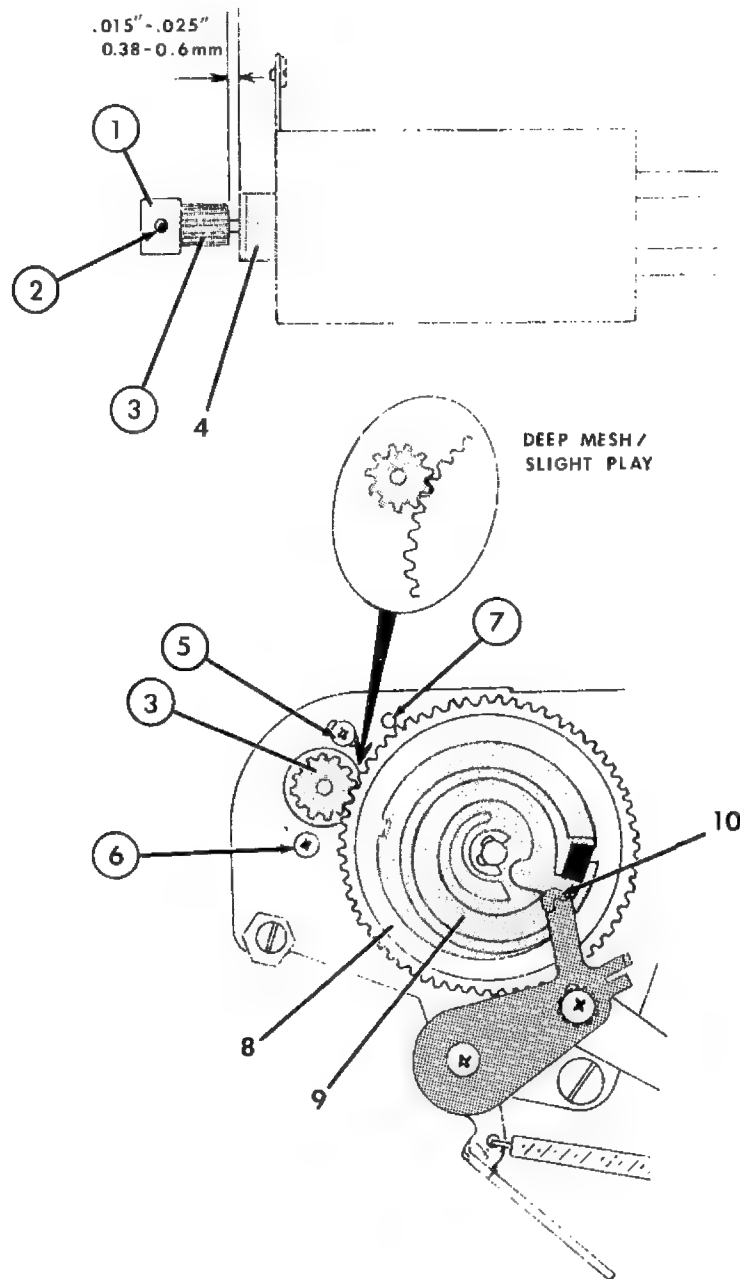
REQUIREMENT:

Mesh between LINESPACE DRIVER GEAR (3) and LINESPACE GEAR (8) should be as deep as possible with slight play between the two Gears.

TO CHECK: Hold DRIVER GEAR (3) and lightly rotate LINESPACE GEAR (8) to check for play between the two Gears. Do not apply downward pressure to LINESPACE GEAR (8). Check for slight play when CAM FOLLOWER (10) is on High Point of LINESPACE CAM (9). Check with Linespace Selector in #1, 1½, & 2 positions.

ADJUSTMENT:

Loosen SCREWS (5) & (6). If necessary, also loosen the SCREW (7) that attaches the Linespace Motor Cover to the Platen Frame. Pivot Linespace Motor toward or away from LINESPACE GEAR (8). Tighten SCREW (5) first; then tighten SCREWS (6) & (7).



3. Linespace Drive

REQUIREMENT: LINESPACE PAWL (4) should contact LINESPACE PAWL STOP (3) at the same time that CAM FOLLOWER (10) reaches High Point of LINESPACE CAM (2).

TO CHECK: Pull Linespace Selector forward to disengage DETENT (6) from WHEEL (5). Rotate GEAR (1) until CAM FOLLOWER (10) is on High Point of CAM (2). Pull DRIVE ARM (8) down. There should be no down play. Rotate GEAR (1) slightly top rearward so that CAM FOLLOWER (10) is just before High Point of CAM (2). Pull DRIVE ARM (8) down. There should be slight down play.

ADJUSTMENT: Loosen SCREW (9). rotate GEAR (1) so that CAM FOLLOWER (10) is on High Point of CAM (2). Pull DRIVE ARM (8) down so that PAWL (4) contacts STOP (3). Hold ARM (8) in this position, and tighten SCREW (9).

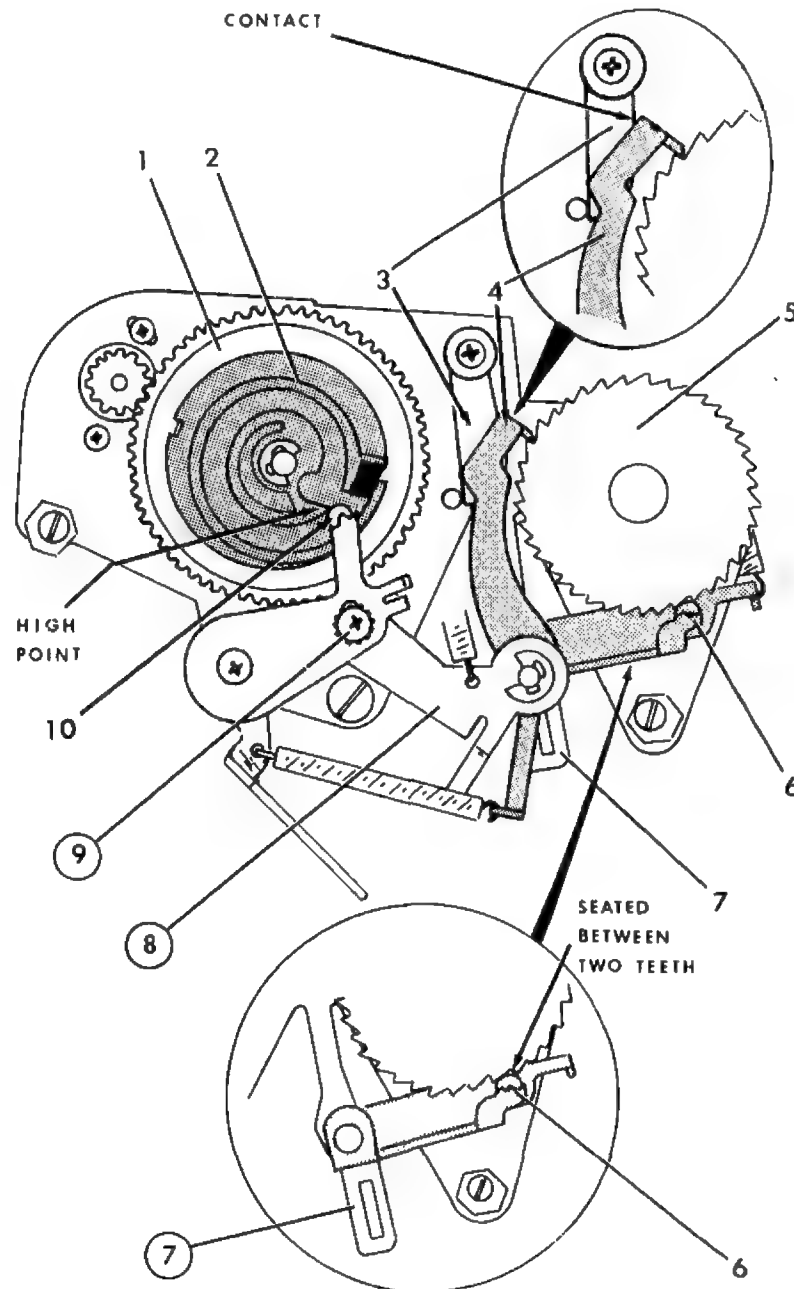
4. Platen Roll

REQUIREMENT: At the end of a Linespace stroke, WHEEL DETENT (6) should seat between two Teeth of LINESPACE WHEEL (5) so that Platen does not roll forward or rearward.

TO CHECK: Put Linespace Selector in position #2, and rotate GEAR (1) to rest position. Pull DRIVE ARM (8) down so that PAWL (4) contacts PAWL STOP (3). Slowly release DRIVE ARM (8), and gently try to rotate Platen Knob forward, then rearward. LINESPACE WHEEL (5) should not move. Check through full revolution of Linespace Wheel.

NOTE: Slight top forward roll is acceptable, but there should be no top rearward roll because a Tooth of Linespace Wheel could trap PAWL (4) against STOP (3), preventing return to rest position.

ADJUSTMENT: Use Screwdriver in Slot to form PLATEN FRAME ARM (7) forward or rearward so that DETENT (6) seats between Linespace Wheel Teeth at end of Linespace stroke.



5. Rest Position of Linespace Pawl

REQUIREMENT:

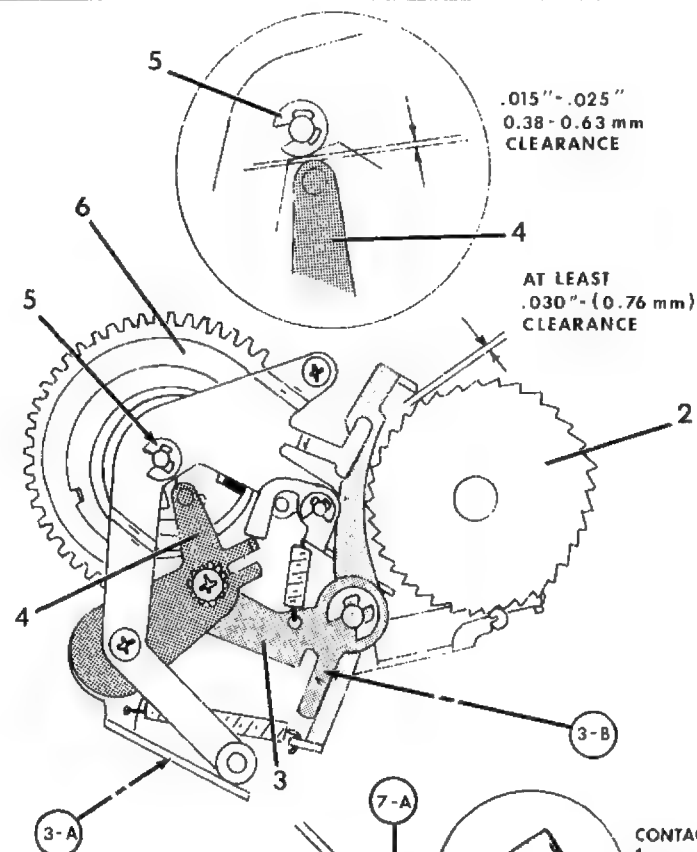
- A) There should be at least .030" clearance between LINESPACE PAWL (1) and LINESPACE WHEEL (2) when Linespace mechanism is at rest and Linespace Selector is in position #2.
- B) There should be .015"-.025" clearance between CAM FOLLOWER (4) and "E" RING (5) when Linespace mechanism is at rest.

ADJUSTMENT:

Form DRIVER ARM EAR (3-A) up or down to meet requirements.

NOTE: If both requirements cannot be obtained by forming DRIVE ARM EAR (3-A), form EAR (3-A) to set the .015"-.025" clearance; then form EAR (3-B) to obtain the .030" clearance.

NOTE: This adjustment assures that when Linespace Selector is in position #2, LINESPACE PAWL (1) safely enters the Tooth that will cause LINESPACE WHEEL (2) to rotate four Teeth during a Linespace stroke. To check, rotate LINESPACE GEAR (6).



6. Linespace Selector Position

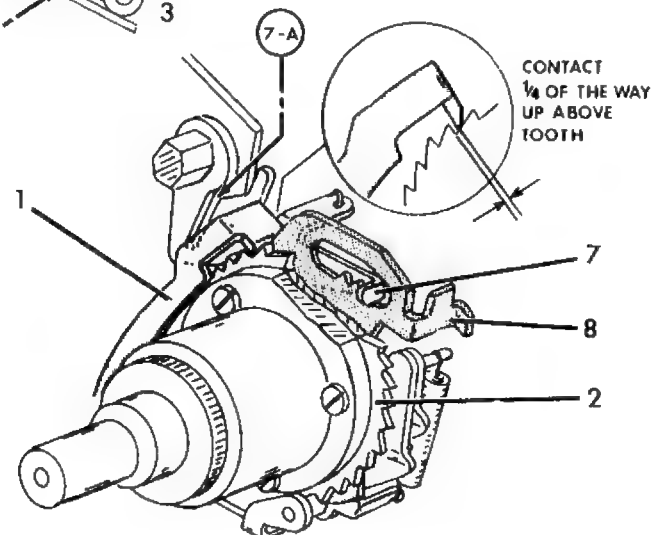
REQUIREMENT:

With LINESPACE SELECTOR (8) in position #1, LINESPACE PAWL (1) should contact back of Tooth approximately 1/4 of the way up above the Tooth that will be driven, and cause LINESPACE WHEEL (2) to rotate two Teeth during a Linespace stroke. To check, rotate Linespace Gear.

NOTE: Check requirement in position #1½. Linespace Wheel should rotate three Teeth.

ADJUSTMENT:

Open LINESPACE SELECTOR DETENT SLOT (7-A) for earlier engagement of Pawl with Wheel; close SLOT (7-A) for later engagement.



7. Anti-Backup Pawl

REQUIREMENT:

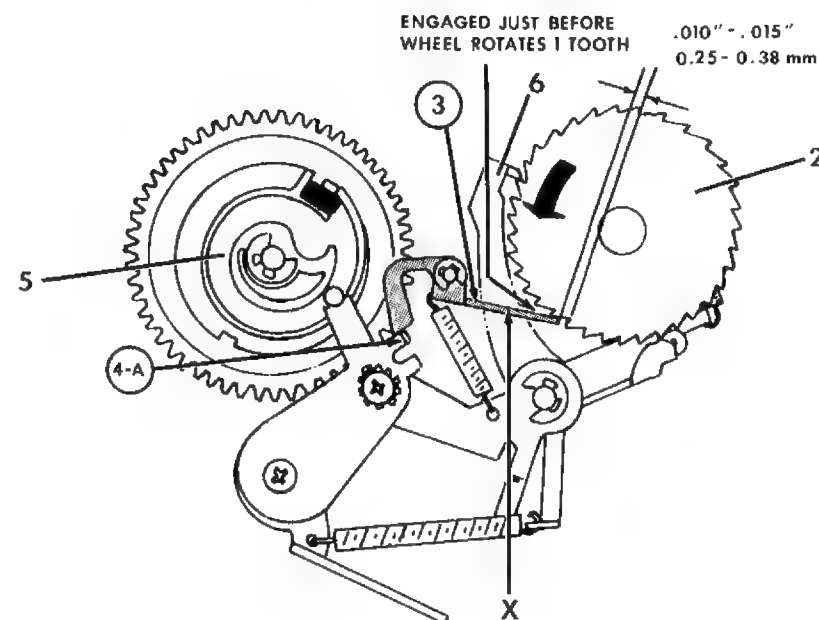
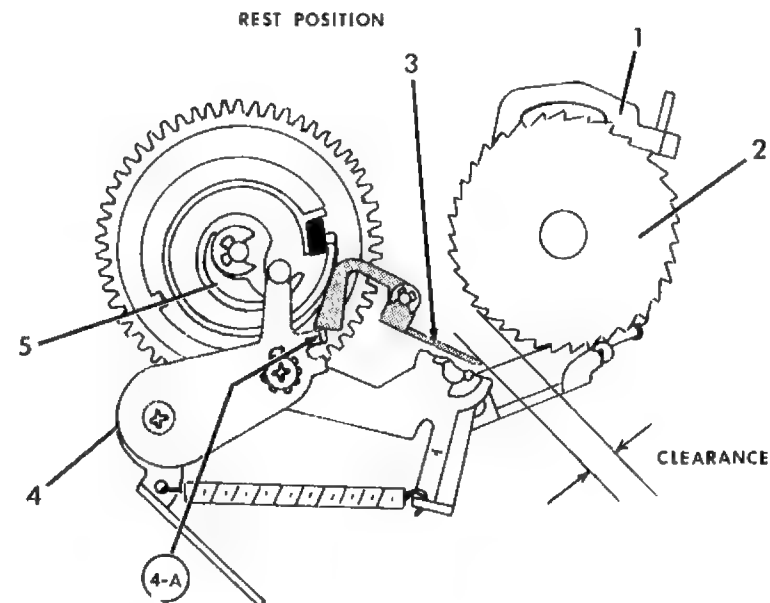
- A) ANTI-BACKUP PAWL (3) should clear LINESPACE WHEEL (2) when Linespace mechanism is at rest position.
- B) ANTI-BACKUP PAWL (3) should engage LINESPACE WHEEL (2) after LINESPACE PAWL (6) engages Wheel, but before LINESPACE PAWL (6) rotates Wheel one Tooth.

TO CHECK: Rotate LINESPACE CAM (5) with LINESPACE SELECTOR (1) in #1 position.

ADJUSTMENT:

Form CAM FOLLOWER EAR (4-A) up or down.

NOTE: When ANTI-BACKUP PAWL (3) engages LINESPACE WHEEL (2), there should be .010"-.015" clearance between end of PAWL (3) and the face of a Linespace Wheel Tooth. Check with LINESPACE SELECTOR (1) in #1 position. If necessary, form PAWL (3) up or down at X. Check requirements above.



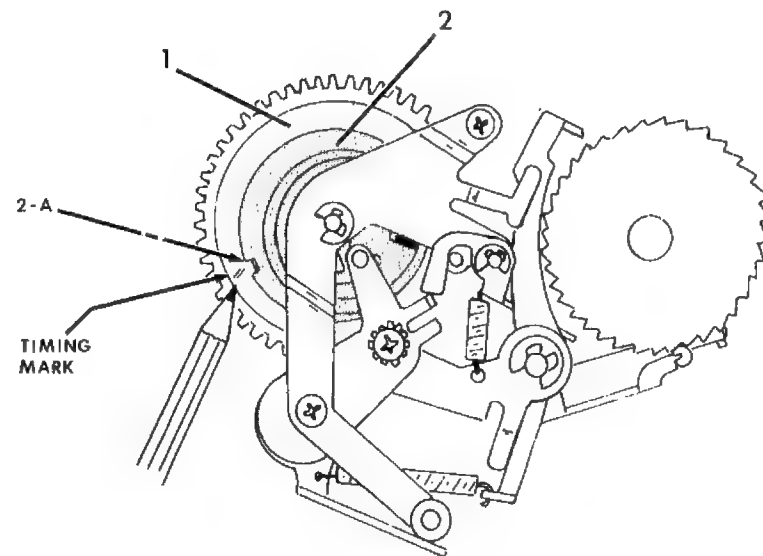
8. Linespace Slip Clutch

REQUIREMENT:

With Linespace Selector at position #2, LINESPACE GEAR (1) should rotate approximately $1 \frac{1}{3}$ revolutions in one powered Linespace stroke.

TO CHECK: With Linespace mechanism at rest, make a mark on LINESPACE GEAR (1) opposite CUT-OUT (2-A) on CAM (2). Use Index Key to activate Linespace. GEAR (1) should rotate approximately $1 \frac{1}{3}$ revolutions on the first stroke. Timing Mark should realign with CUT-OUT (2-A) in ten Linespace strokes.

NOTE: Before checking requirement, exercise Slip Clutch by activating Linespace 20 times.

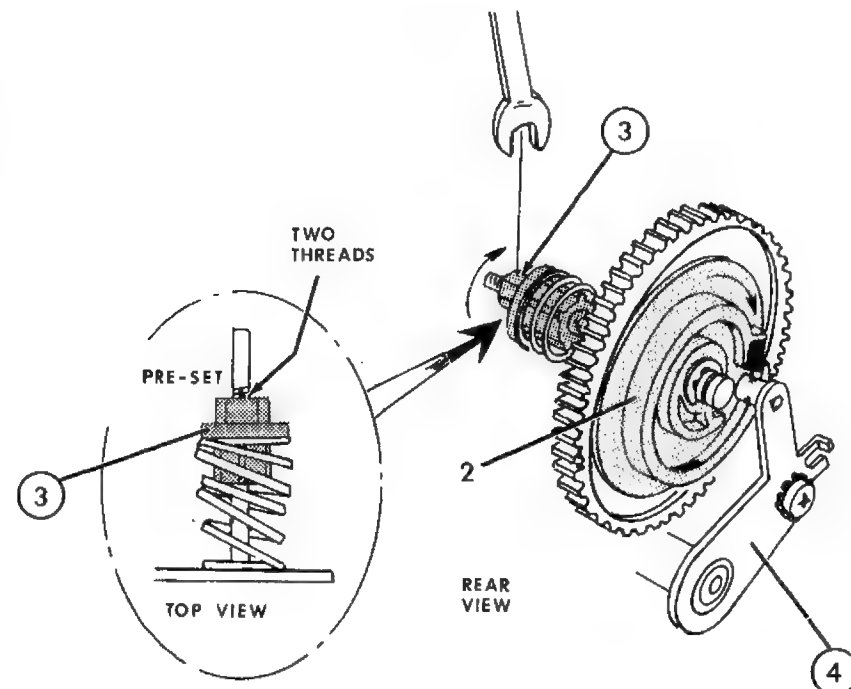


ADJUSTMENT:

- A) To increase Slip Clutch tension, rotate LINESPACE CAM (2) to rest position, and turn ADJUSTER (3) top rearward.
- B) To decrease Slip Clutch tension, pull CAM FOLLOWER (4) down, and hold it down while turning ADJUSTER (3) top forward.

PRE-SET ADJUSTMENT:

Regulate ADJUSTER (3) so that two threads of Shaft are visible to the right of ADJUSTER (3).



CARRIER DRIVE ADJUSTMENTS

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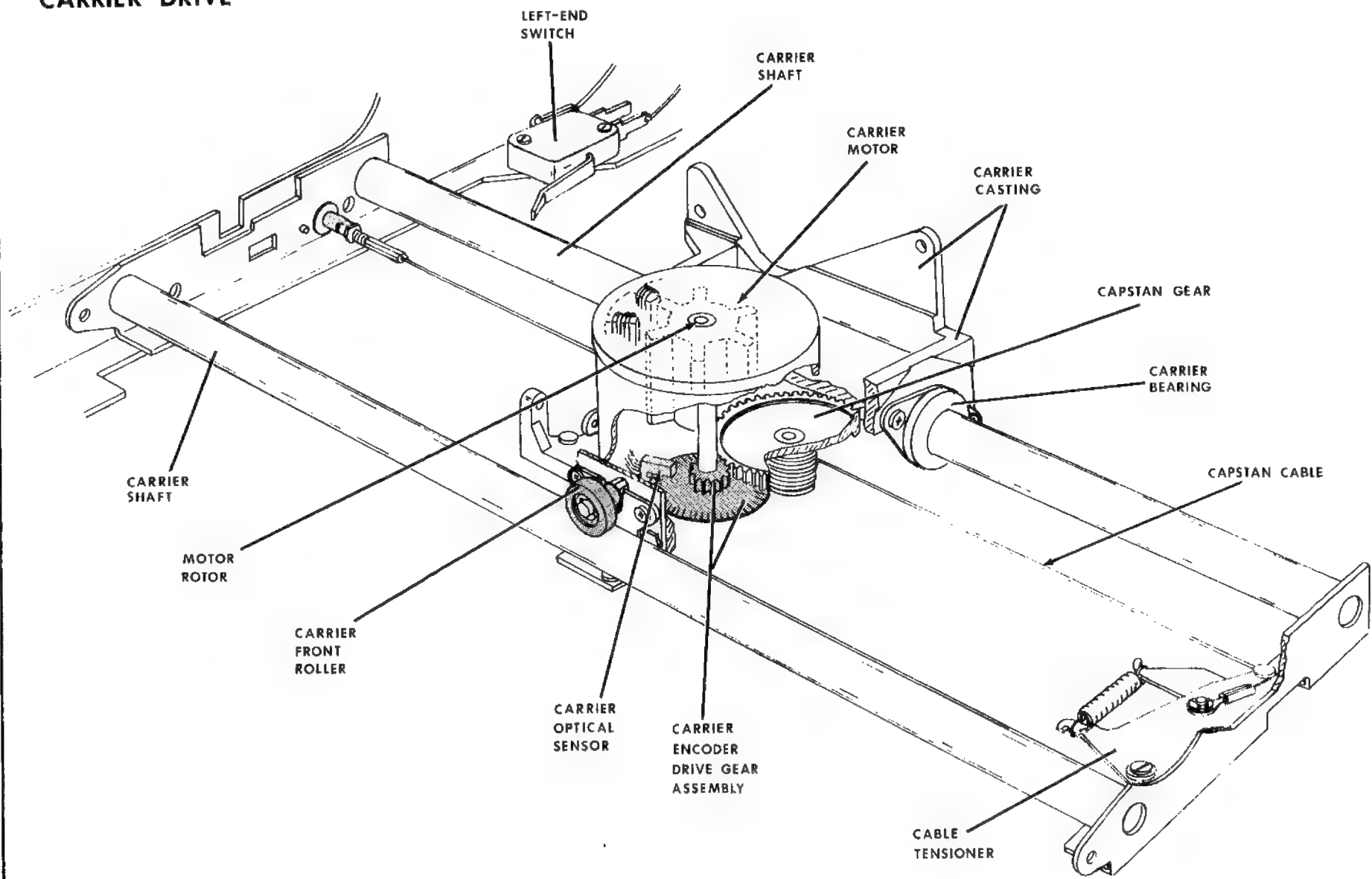
6

1. Carrier Front Roller Adjustment
2. Carrier Encoder-Drive Gear Alignment
3. Carrier Optical Sensor Alignment
4. Capstan Gear Bracket Adjustment
5. Capstan Cable Tension Adjustment
6. Left End Switch



Circled numbers in the illustrations indicate adjustment points.

CARRIER DRIVE



1. Carrier Front Roller Adjustments

REQUIREMENT:

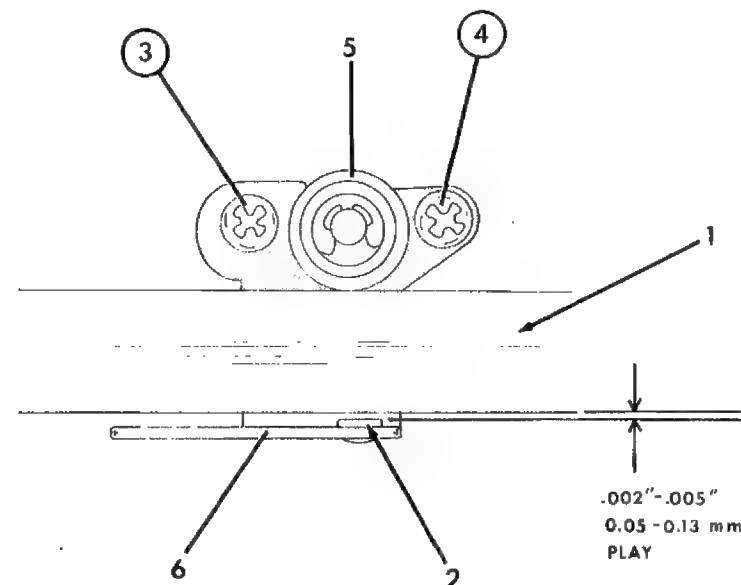
There should be .002"-.005" clearance between Front Carrier SHAFT (1) and Carrier SLIDER (2).

ADJUSTMENT:

Loosen Front Bracket SCREWS (3) & (4). Insert Shim between Front ROLLER (5) and top of Front Carrier SHAFT (1). Hold ROLLER (5) against Shim and lift Front Bracket ASSEMBLY (6) so that Carrier SLIDER (2) is against bottom of Front Carrier SHAFT (1). Tighten Bracket SCREWS (3) & (4).

NOTE: Carrier should travel freely on Carrier Shafts. If Carrier travel binds, determine cause (freeness of Motor Rotor and related parts, bearings, etc.). Also, Rear Bearings should have no more than .002" play on Shaft. Replace parts if necessary.

FRONT VIEW



2. Carrier Encoder-Drive Gear Alignment

REQUIREMENT:

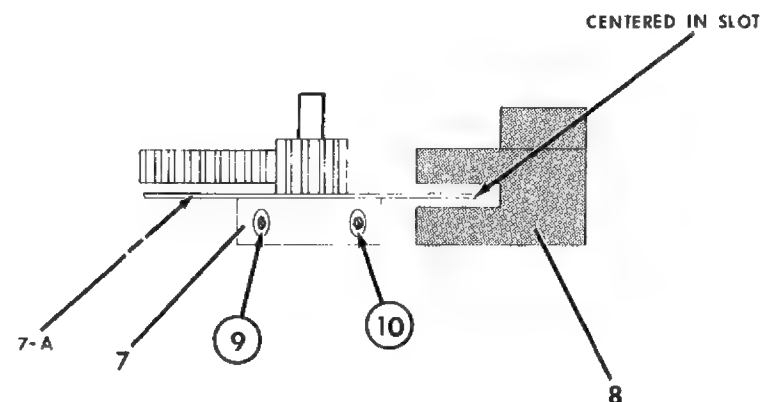
ENCODER DISC (7-A) should be centered (top to bottom) in Slot of CARRIER OPTICAL SENSOR (8).

TO CHECK: Move Carrier, and check that Disc is approximately centered in Slot during its full revolution. It should not contact the Sensor housing.

ADJUSTMENT:

Loosen SET SCREWS (9) & (10). Position ENCODER DRIVE GEAR (7) on Motor Rotor Shaft, and tighten SET SCREWS (9) & (10).

LEFT REAR VIEW



3. Carrier Optical Sensor Alignment

REQUIREMENT:

When Carrier Motor Rotor is at Phase 1 position, OPTICAL SENSOR (2) should be centered over a Blade of ENCODER DISC (1-A) so that output voltage of OPTICAL SENSOR (2) is the lowest possible (no more than .050 volts).

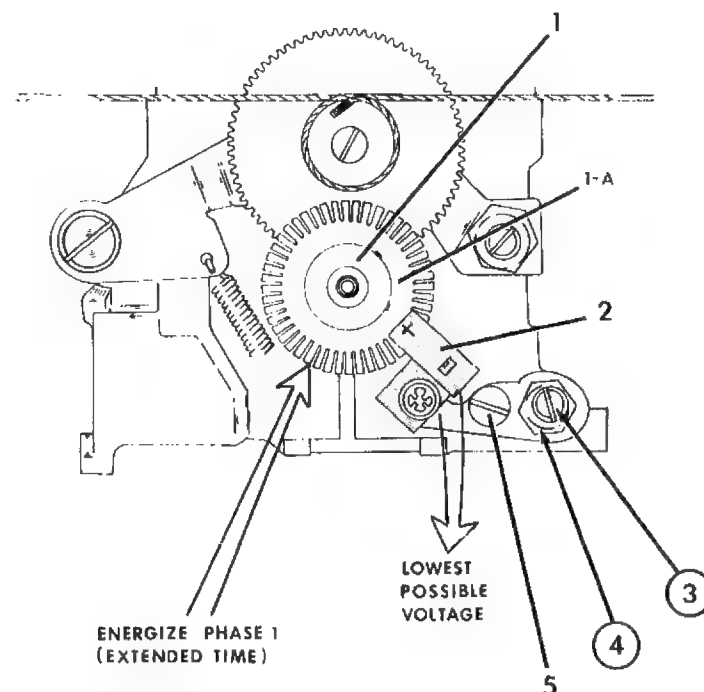
TO CHECK: Use an Electronic Voltmeter to determine output voltage of Sensor--see PC Board Component Diagram. Energize Carrier Motor Phase 1 (extended time). Verify that output voltage of the Optical Sensor is the lowest possible by slowly rotating ENCODER-DRIVE GEAR (1) in one direction, then the other. The voltage should not dip lower as Gear is rotated.

IMPORTANT: Shield the Sensor from external light when checking this requirement.

NOTE: Optical Sensor output voltage should not exceed .050 volts at any energized Phase position of the Motor Rotor. To check, sequentially energize Motor Phase Windings so that the Motor Rotor rotates one full revolution. If voltage readings are not correct, check eccentricity of ENCODER DISC (1-A) or related parts.

Also, highest output voltage of the Sensor should be at least 1.7 volts. To check, rotate ENCODER-DRIVE GEAR (1) so that Optical Sensor is centered over a window of the Encoder Disc.

BOTTOM VIEW

ADJUSTMENT:

1. Loosen ECCENTRIC SCREW (3). Energize Carrier Motor Phase 1 (extended time). NOTE: Check that SCREW (5) is tight prior to adjustments.
2. Regulate ECCENTRIC (4) to position the Optical Sensor so that Meter indicates lowest possible output voltage. While holding the Eccentric, tighten the ECCENTRIC SCREW (3).
3. Verify that the true low is maintained.

4. Capstan Gear Bracket Adjustment

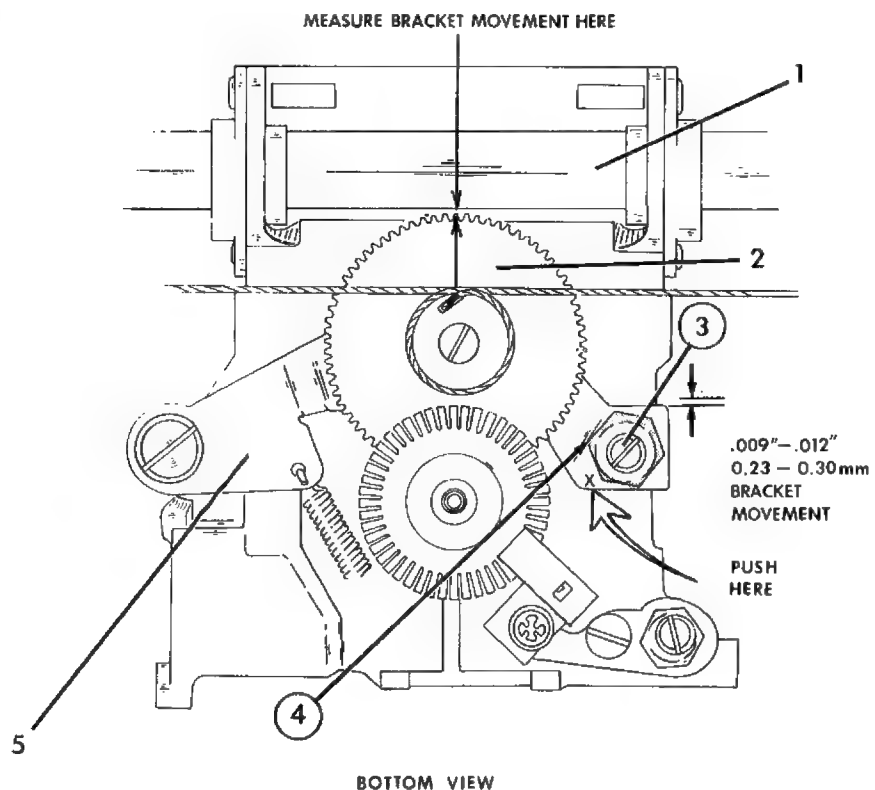
REQUIREMENT:

When pushed lightly rearward at X, CAPSTAN BRACKET (5) should have .009"-.012" rearward movement.

TO CHECK: With parts at rest, use shims to measure clearance between CARRIER RAIL (1) and CAPSTAN GEAR (2). Push BRACKET (5) rearward, and measure clearance again. The second shim measurement should be .009"-.012" less than the first.

ADJUSTMENT:

Loosen SCREW (3), and regulate ECCENTRIC (4) to increase or decrease movement.



5. Capstan Cable Tension Adjustment

REQUIREMENT:

With SCREW (3) loose, the POINTER (4-A) of the TENSIONER (4) must be in WINDOW (5).

ADJUSTMENT:

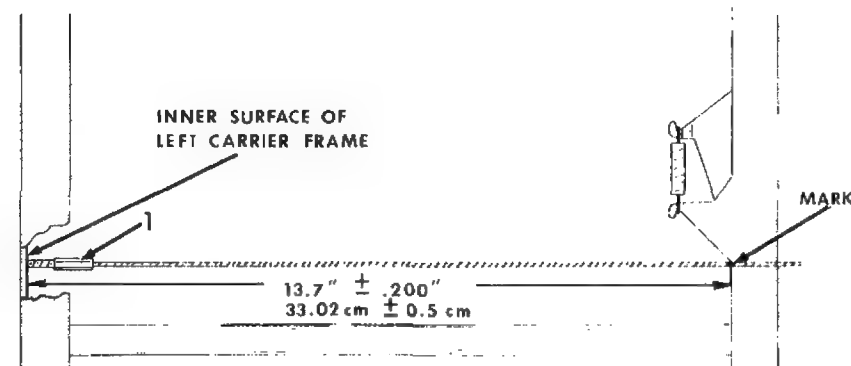
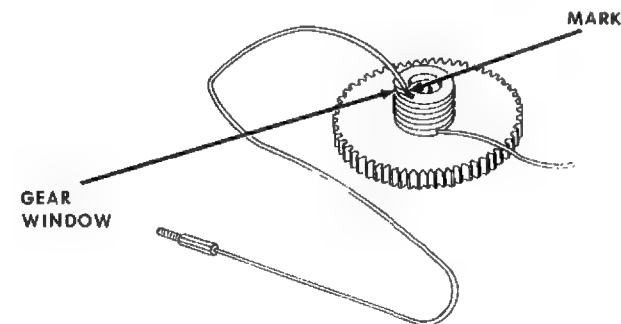
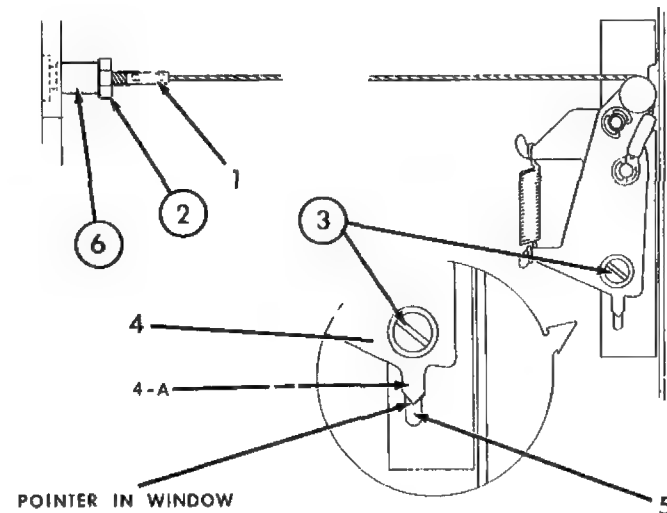
Loosen SCREW (3) and LOCK NUT (2). Hold THREADED TERMINAL END (1) with a pair of Pliers, and regulate CABLE NUT (6) so the POINTER (4-A) is in the WINDOW (5). Tighten LOCK NUT (2) while holding CABLE NUT (6). Tighten SCREW (3).

NOTE: A new cable must be exercised to maintain proper cable tension. To do so, move Carrier to right and left extremes. Re-make adjustment. Repeat procedure 4 or 5 times until adjustment is stable.

NEW CABLE INSTALLATION:

Make a mark on the cable $13.7'' \pm .200''$ from the Threaded Terminal End. Slide cable through Capstan Gear so the mark is located in the Gear Window. This is the correct location of the cable in the Capstan Gear. Each side of the cable should be wound approximately 4 turns, and the Capstan Gear Assembly should be installed with the Carrier in center position.

NOTE: The distance from the inner surface of the left Carrier frame to the bottom edge of the right Carrier frame is $13.7''$ --use this dimension to measure the cable.



BOTTOM VIEW

6. Left End Switch

REQUIREMENT:

When Left BOSS (2) of Carrier Casting is located approximately .125" from inside of Carrier Side Frame and Carrier Motor Phase 1 is energized:

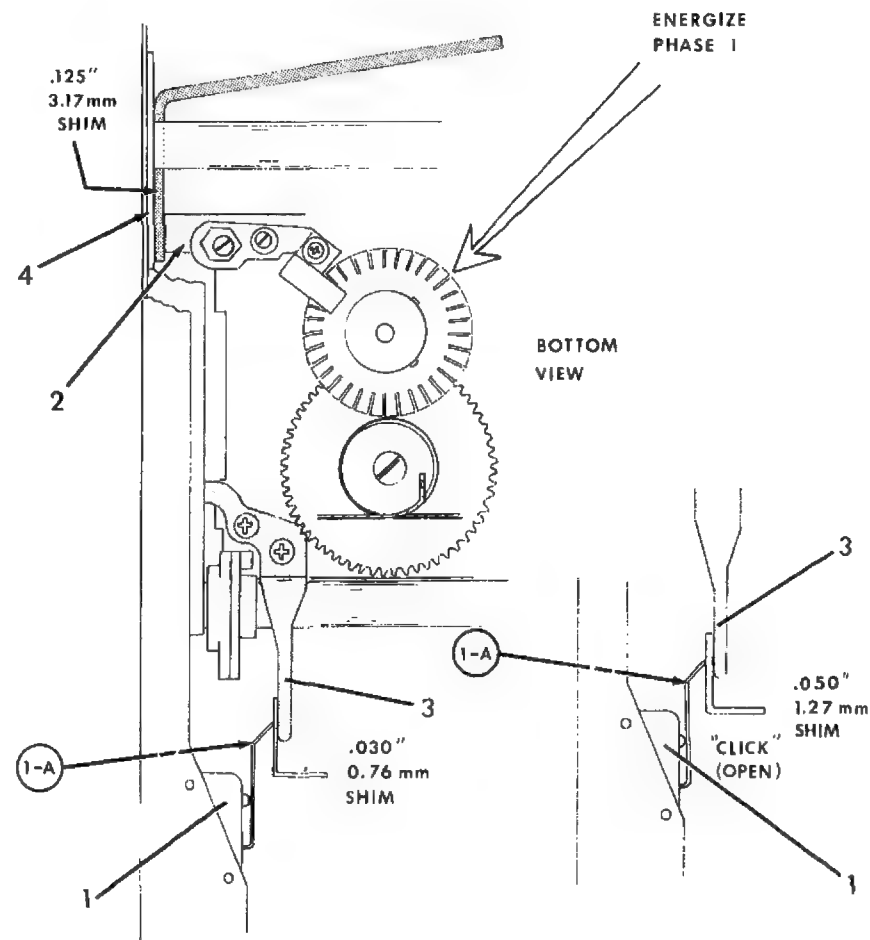
- A) Left End SWITCH (1) should be closed with a .030" Shim inserted between DOWN STOP ARM (3) and SWITCH ACTUATOR (1-A).
- B) Left End SWITCH (1) should be open with a .050" Shim inserted between DOWN STOP ARM (3) and SWITCH ACTUATOR (1-A).

TO CHECK: Insert a .125" Shim at inside of Carrier Side Frame and move Carrier Assembly until Shim is between SIDE FRAME (4) and BOSS (2) of the Carrier Casting. Remove Shim without moving Carrier Assembly. Energize Carrier Motor Phase 1 (extended time). Bias Carrier Assembly left or right until Carrier electrically moves into Phase 1 position. Check Left End Switch requirements.

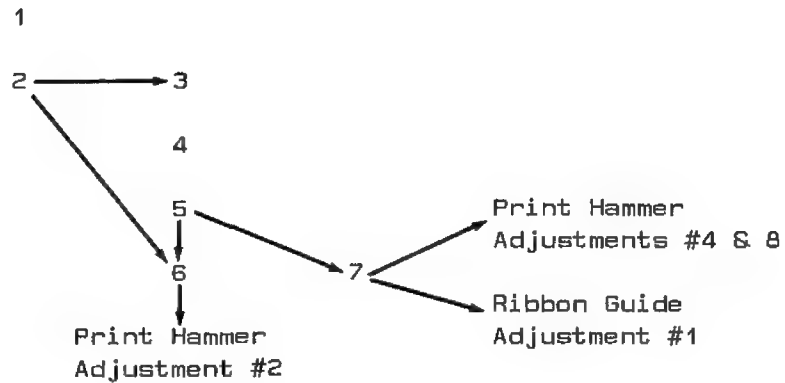
NOTE: If the Carrier chatters at the left end during initialization, or goes one extra space at extreme right end, remake adjustment with Carrier biased in the opposite direction.

ADJUSTMENT:

Form SWITCH ACTUATOR (1-A) left or right to meet requirements. Check that BRACKET ARM (3) is approximately centered on SWITCH ACTUATOR (1-A). If necessary, form BRACKET ARM (3) up or down.



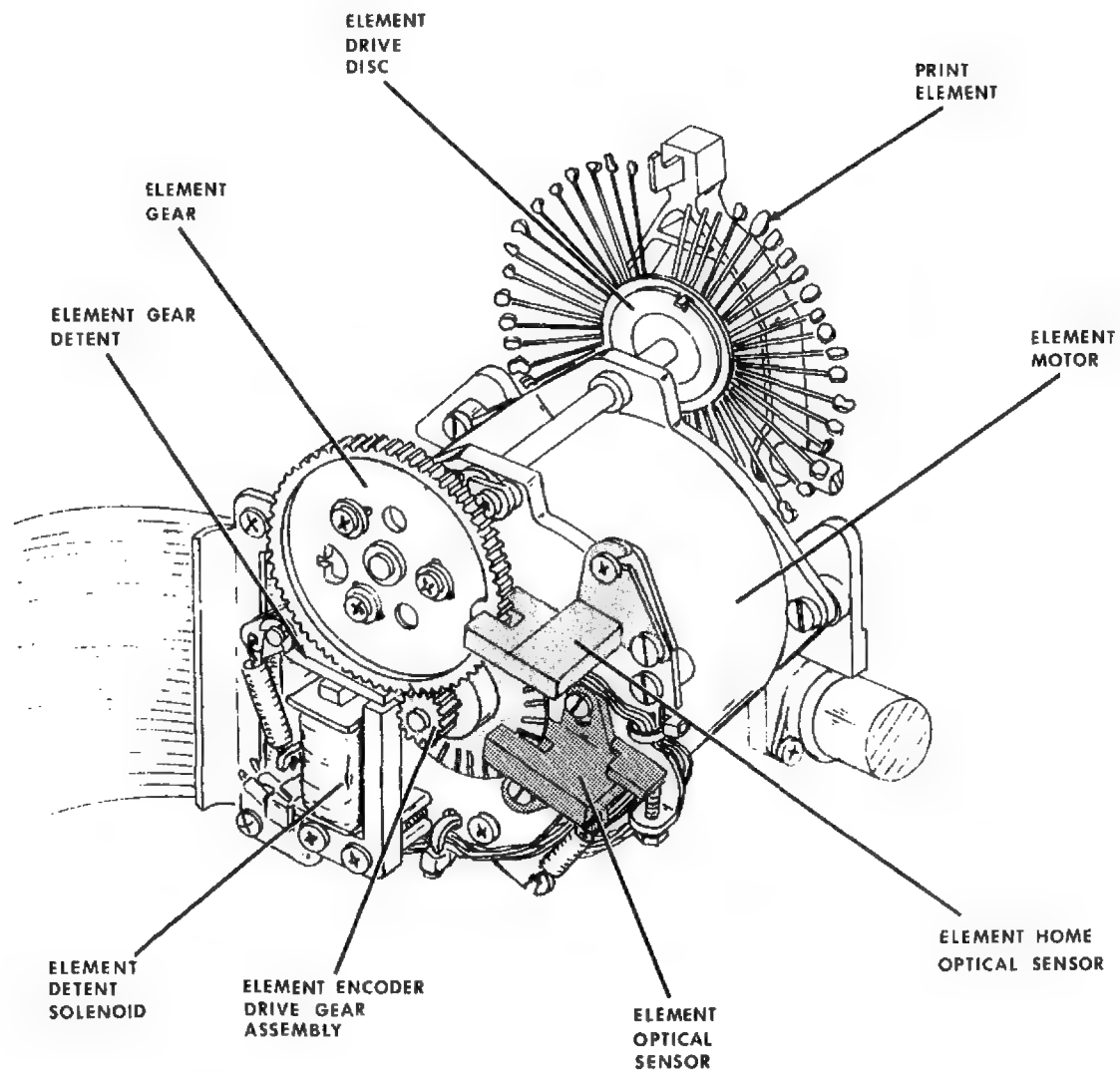
PRINT ELEMENT ADJUSTMENTS



1. Position of Element Detent Solenoid
2. Element Encoder-Drive Gear Alignment
3. Element Optical Sensor Alignment
4. Element Home Optical Sensor Alignment
5. Element Drive Disc Position
6. Fine Alignment of the Print Element
7. Element Off Platen Clearance

○ Circled numbers in the illustrations indicate adjustment points.

PRINT ELEMENT



1. Position of Element Detent Solenoid

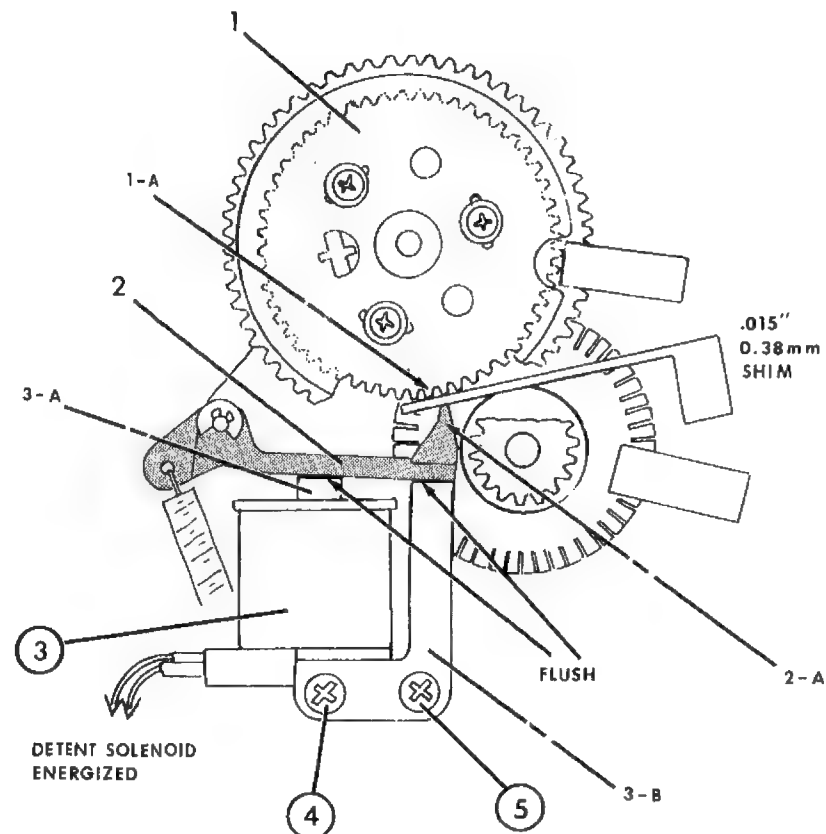
REQUIREMENT:

When ELEMENT DETENT SOLENOID (3) is energized, ELEMENT GEAR DETENT (2) should be flush against both SOLENOID POLES (3-A) & (3-B), and there should be .013"-.017" clearance between GEAR DETENT TOOTH (2-A) and INSIDE ELEMENT GEAR TEETH (1-A).

TO CHECK: Energize Element Detent Solenoid.

ADJUSTMENT:

1. Loosen SCREWS (4) & (5).
2. Energize Element Detent Solenoid.
3. Insert .015" Element Detent Gage between GEAR DETENT TOOTH (2-A) and INSIDE ELEMENT GEAR TEETH (1-A).
4. Position ELEMENT DETENT SOLENOID (3) to meet requirement.
5. Tighten SCREWS (4) & (5).



2. Element Encoder-Drive Gear Alignment

REQUIREMENT:

- A) With ELEMENT GEAR DETENT (6) engaged with ELEMENT GEAR (1) at Home position, ELEMENT ENCODER-DRIVE GEAR (5) should be centrally aligned with Phase 1 position of Element Motor Rotor.

TO CHECK: Rotate ELEMENT GEAR (1) so it is detented at Home position. Pulse Phase 1 of Element Motor and Element Detent Solenoid. ENCODER-DRIVE GEAR (5) should not move the second and subsequent times that Phase 1 is energized.

Fine Tune: Rotate ENCODER-DRIVE GEAR (5) to take up Gear play in one direction, and energize Phase 1. Then, take up play in opposite direction, and energize Phase 1. ENCODER-DRIVE GEAR (5) movement should be equal in both directions. NOTE: To determine amount of movement, observe movement of ENCODER DISC (5-A) against an edge of ELEMENT OPTICAL SENSOR (4).

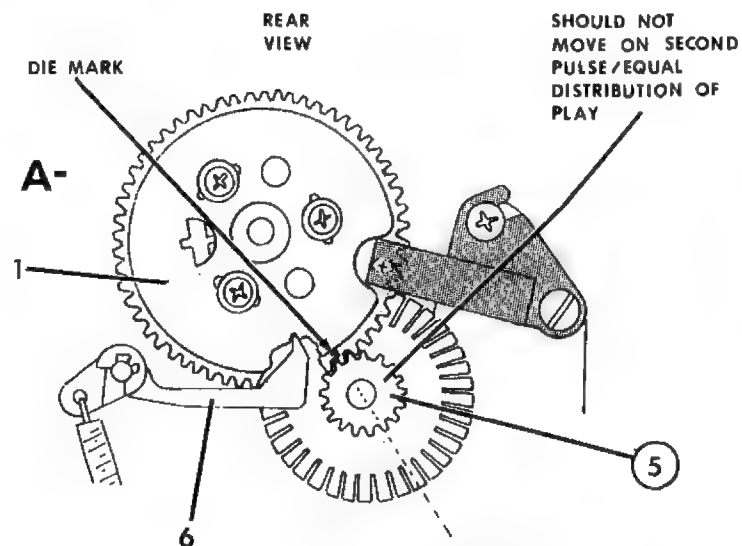
- B) ENCODER DISC (5-A) should be approximately centered (front to rear) in Slot of ELEMENT OPTICAL SENSOR (4) during full revolution of Encoder Disc.

ADJUSTMENT: Loosen SET SCREWS (2) & (3)--rotate Gear if necessary to gain access to Screws. Rotate ELEMENT GEAR (1) so that DETENT (6) engages Gear at Home position.

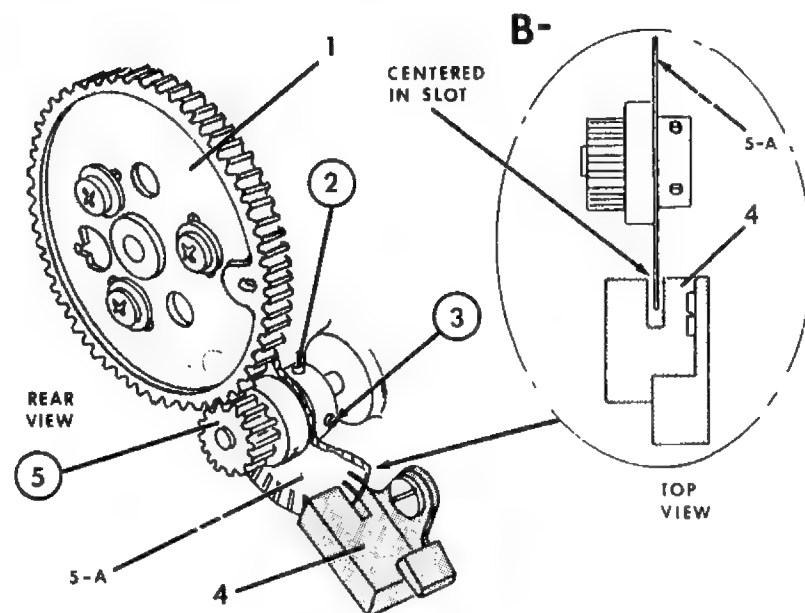
Energize Phase 1 of Element Motor; do not energize Element Detent Solenoid.

Move ENCODER-DRIVE GEAR (5) forward and rearward on Motor Rotor Shaft to center ENCODER DISC (5-A) in Slot of OPTICAL SENSOR (4).

Rotate ENCODER-DRIVE GEAR (5) to take up Gear play in one direction, then in the opposite direction. Position GEAR (5) between the two extremes so there is an equal distribution of play, and tighten SET SCREWS (2) & (3).



HOME POSITION
DIE MARK ALIGNED WITH
CENTERLINE OF ELEMENT
MOTOR ROTOR



3. Element Optical Sensor Alignment

REQUIREMENT: When Element Motor Rotor is at Phase 1 position, ELEMENT OPTICAL SENSOR (3) should be centered over a Blade of ENCODER DISC (1-A) so that output voltage of the OPTICAL SENSOR (3) is the lowest possible (no more than .050 volts).

TO CHECK: Energize Element Motor Phase 1 and Element Detent Solenoid. Determine output voltage of Element Optical Sensor (use Electronic Voltmeter--see PC Board Component Diagram). To verify that output voltage of the Optical Sensor is the lowest possible, slowly rotate ENCODER-DRIVE GEAR (1) in one direction, then the other--voltage should not dip lower as Gear is rotated.

IMPORTANT: Shield the Sensor from external light when checking this requirement.

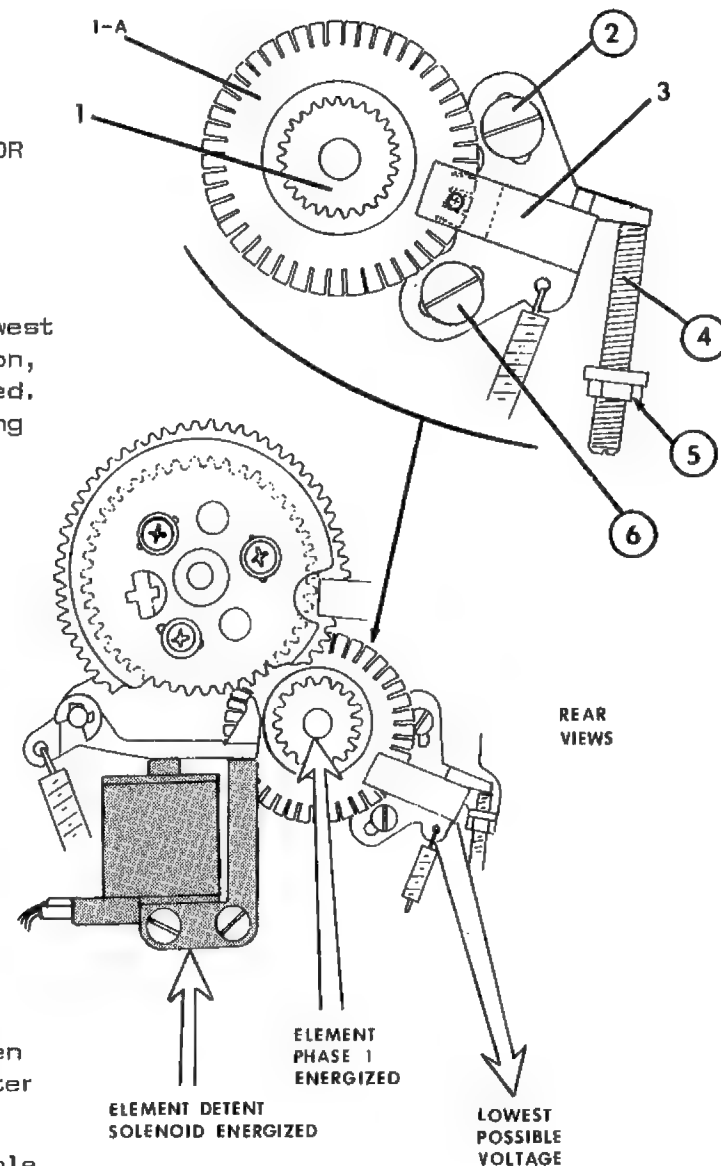
NOTE: Optical Sensor output voltage should not exceed .050 volts at any energized phase position of the Motor Rotor. To check, sequentially energize all Motor Phase Windings so that Motor Rotor rotates one full revolution (24 steps). If it does and the above requirement is met, check eccentricity of ENCODER DISC (1-A) or related parts.

Also, highest output voltage of the Sensor should be at least 1.7 volts. To check, rotate ENCODER-DRIVE GEAR (1) so that Optical Sensor is centered over a window of the Encoder Disc.

ADJUSTMENT:

1. Loosen ADJUSTER SCREW LOCK NUT (5). Loosen ADJUSTER BRACKET SCREWS (2) & (6).
2. Energize Element Motor Phase 1 and Detent Solenoid.
3. Regulate ADJUSTER SCREW (4) to position Optical Sensor so that Meter indicates lowest possible output voltage. Tighten ADJUSTER BRACKET SCREWS (2) & (6). Hold SCREW (4) and tighter NUT (5). Verify that the true low is maintained.

IMPORTANT: Regulate SCREW (4) midway when the lowest possible voltage is maintained during a portion of a revolution of the Screw.



4. Element Home Optical Sensor Alignment

REQUIREMENT: When ELEMENT GEAR (1) is at Home position, and Element Motor Rotor is at Phase 1 position, ELEMENT HOME OPTICAL SENSOR (2) should be centered over Hole in ELEMENT GEAR (1) so that output voltage of OPTICAL SENSOR (2) is the highest possible.

TO CHECK: Make sure Element Gear is detented at Home position; then energize Element Motor Phase 1 and Element Detent Solenoid. Using an Electronic Voltmeter, verify that output voltage of Optical Sensor is the highest possible. Slowly rotate ELEMENT GEAR (1) in one direction, then the other. Voltage should not rise as Gear is rotated.

FINE ALIGNMENT: Energize Element Detent Solenoid and Element Phase Windings in the following order: Phase 1, Phase 2, Phase 1, and Phase 4. Note Optical Sensor output voltages at Phases 2 and 4; voltage readings should be approximately equal (within .200 volts) and neither reading should exceed .500 volts.

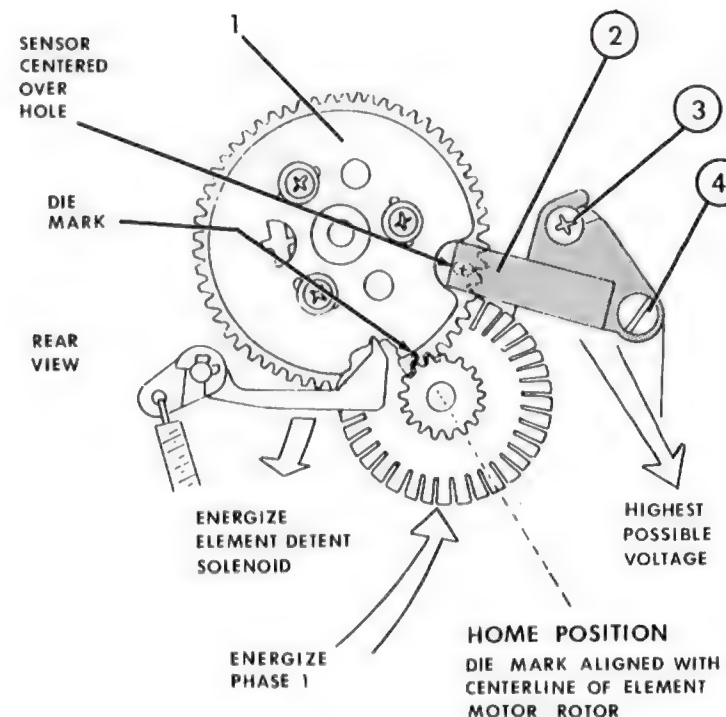
NOTE: Shield the Sensor from direct light when checking requirement.

ADJUSTMENT: Make sure ELEMENT GEAR (1) is detented at Home position.

1. Loosen SCREWS (3) & (4).
2. Position OPTICAL SENSOR (2) so that Meter indicates highest possible output voltage.
3. Tighten SCREWS (3) & (4). Verify that true high is maintained at Phase 1 position, and that the readings at Phases 2 and 4 are approximately equal.

Electrical Specifications of Element Home Sensor: When checked with Electronic Voltmeter, highest voltage should be no less than 1.7 volts.

Lowest output voltage should be no more than 0.1 volts except at Phases 2 and 4 positions of Fine Alignment. To check, rotate ELEMENT GEAR (1) so that Hole in Element Gear is away from the Optical Sensor.



5. Element Drive Disc Position

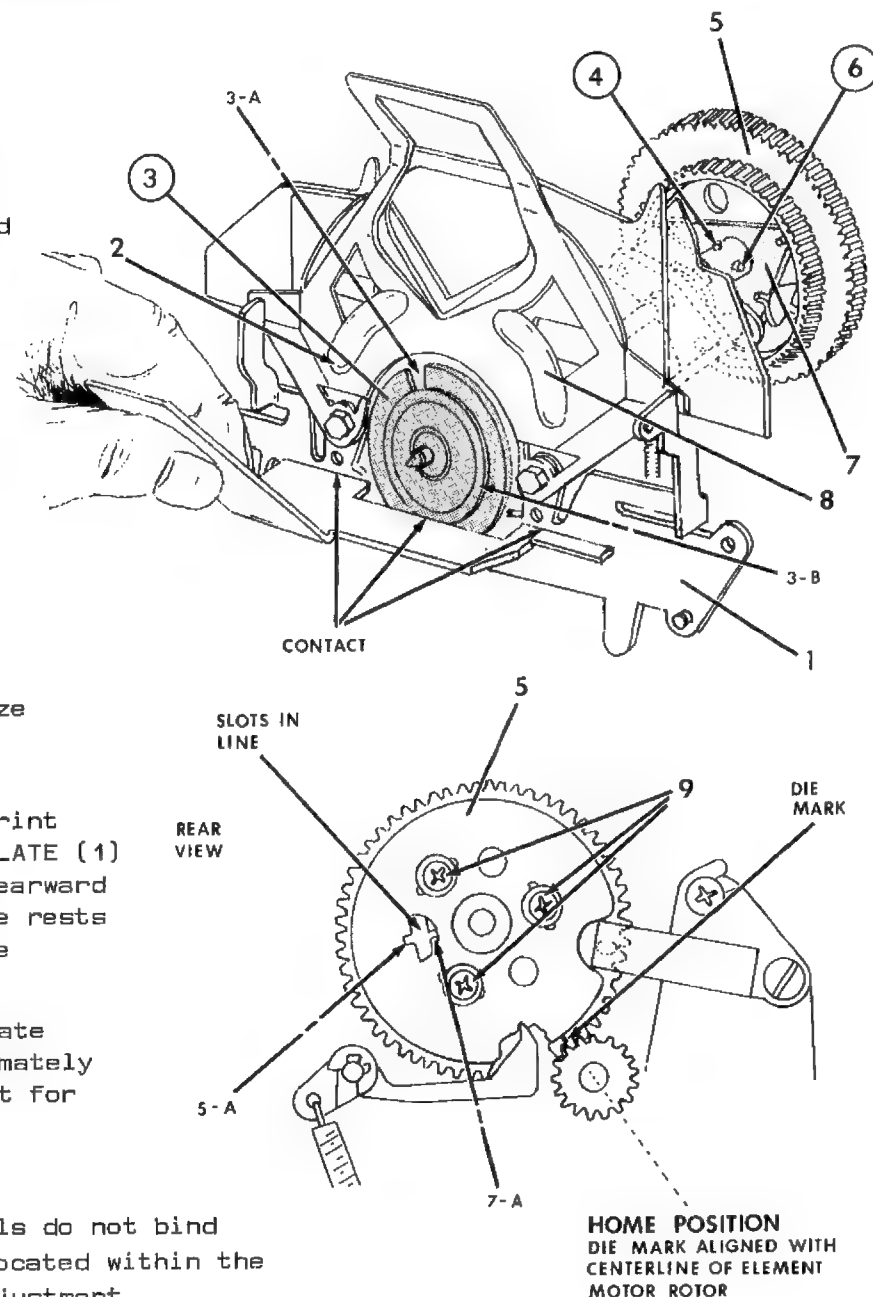
REQUIREMENT: Raised SURFACE (3-B) of ELEMENT DRIVE DISC (3) should extend .155" beyond front of Ribbon Guide MOUNTING PLATE (1).

TO CHECK: Position Print Element/Hammer Gage against Ribbon Guide MOUNTING PLATE (1) as shown. Gage should contact raised SURFACE (3-B), and rest on front of Ribbon Guide Mounting Plate (see illustration).

ADJUSTMENT: (This procedure provides coarse adjustment for Print Element Fine Alignment).

1. Loosen FINE ADJUST SCREWS (9), and rotate ELEMENT DRIVE DISC (3) so that ADJUSTING SLOT (5-A) in Gear aligns with SLOT (7-A) in FINE ADJUST PLATE (7). Tighten SCREWS (9). **NOTE:** This will provide for fine adjustment of the Print Element in either direction when making Adjustment #6.
2. Loosen SCREWS (4) & (6).
3. Hold ELEMENT GEAR (5) detented at Home position as follows: Rotate GEAR (5) to Home position. Energize Phase 1 of Element Motor (extended time), but leave Detent Solenoid disabled.
4. With GEAR (5) detented at Home position, position Print Element/Hammer Gage against Ribbon Guide MOUNTING PLATE (1) as shown. Move ELEMENT DRIVE DISC (3) forward or rearward so that raised SURFACE (3-B) contacts Gage, and Gage rests on front surface of Ribbon Guide Mounting Plate (see illustration).
5. With raised Surface of Drive Disc against Gage, rotate Disc so that Large SLOT (3-A) is positioned approximately at 11 o'clock. **NOTE:** This is the coarse adjustment for the Print Element alignment.
6. Tighten SCREWS (4) & (6).

NOTE: This adjustment assures that: 1) Character petals do not bind on PADS (2) & (8) of Ribbon Guide; 2) the Element is located within the adjustment range of the Platen for proper off Platen adjustment.



6. Fine Alignment of the Print Element

REQUIREMENT:

- A) The PRINT ELEMENT (1) should be aligned so that the proper characters are selected during typing.
- B) When ELEMENT GEAR (5) is detented, characters should be at 12 o'clock position.

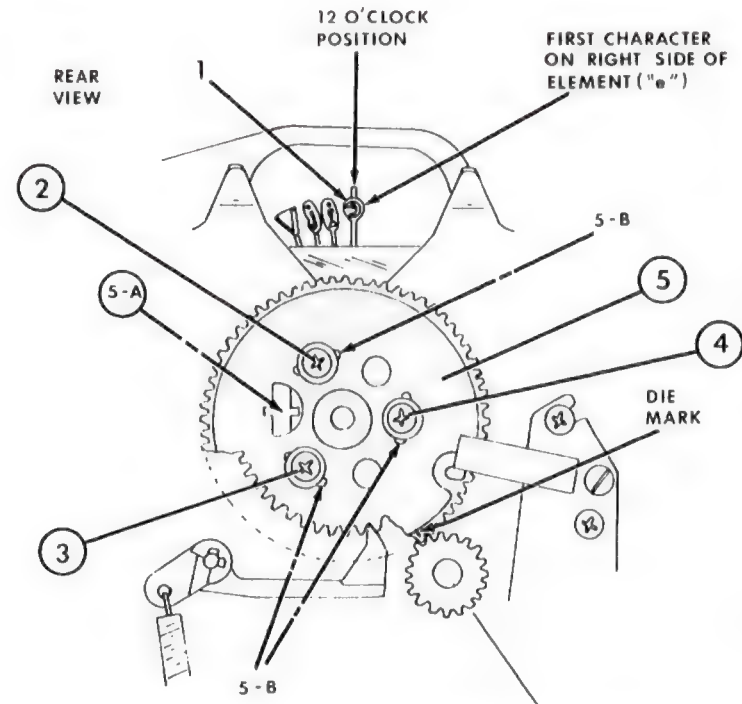
TO CHECK:

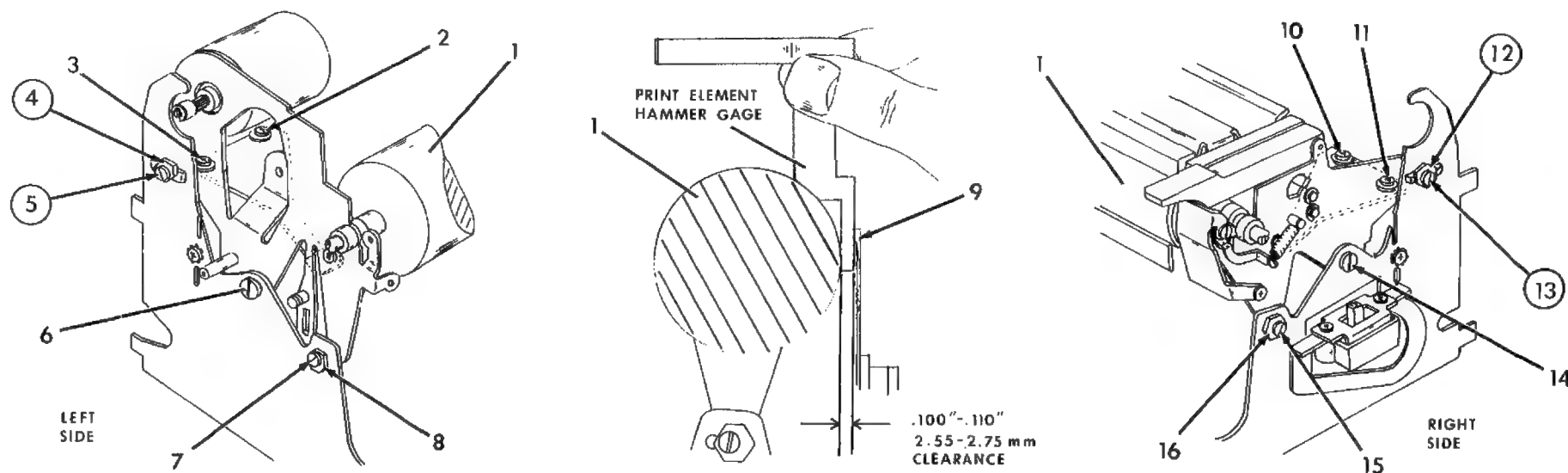
- A) For proper character selection: With PRINT ELEMENT (1) in place, rotate GEAR (5) so that it detents at Home position. Energize Phase 4, then Phase 3 of of Element Motor. The first character on the right side of the Element ("e" on 1063 Keyboard) should be at 12 o'clock position.
- B) For fine alignment: Rotate GEAR (5) so that a long, thin character (such as 1) is at typing position. With GEAR (5) detented, check that the character is at true 12 o'clock position (parallel with Print Hammer).

ADJUSTMENT:

1. Loosen FINE ADJUST SCREWS (2) (3) (4).
2. Rotate ELEMENT GEAR (5) to Home position.
3. Pulse Phase 4, then Phase 3 of Element Motor and Element Detent Solenoid.
4. With Motor and Solenoid de-energized, make sure that Gear remains detented in Phase 3 position. Use Screwdriver in adjusting SLOT (5-A) to rotate PRINT ELEMENT (1) so that first character on the right side of the Element ("e" on 1063 Keyboard) is at true 12 o'clock position.
5. Tighten SCREW (2). Rotate GEAR (5) to tighten SCREWS (3) & (4).

NOTE: If adjustment cannot be obtained within the adjustable range of Gear SLOTS (5-B), follow the coarse alignment procedure in Adjustment #5.





7. Element Off Platen Clearance

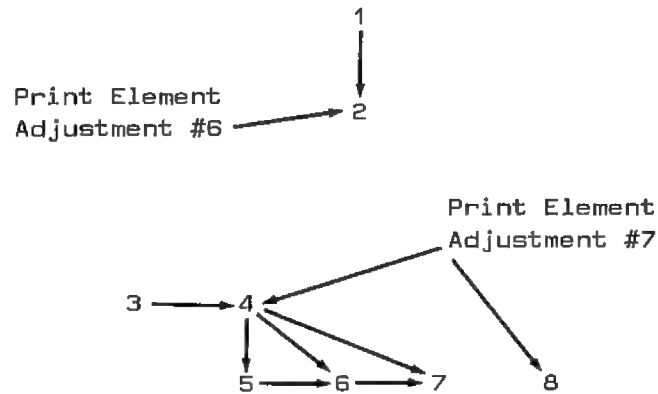
REQUIREMENT: There should be .100"-.110" clearance between Type Face of PRINT ELEMENT (9) and PLATEN (1) along entire length of Carrier Travel.

TO CHECK: Rotate Element Gear so that a broad faced character ("H") is at print point. Insert .105" surface of Print Element/Hammer Gage between Platen and Type Face. Check with Carrier at extreme left first; then move Carrier to extreme right and check again. **NOTE:** Off Platen clearance should be the same for all characters of the Print Element during full revolution of Platen. (If not, check related parts).

ADJUSTMENT:

1. Loosen BRACKET SCREWS (2) (3) (10) (11).
2. Loosen SCREWS (5) (6) (7) (13) (14) (15).
3. Regulate Front ECCENTRICS (8) & (16) so that High Points face forward. **NOTE:** This sets the Platen Height so that it is approximately equal at both ends.
4. Regulate Left REAR ECCENTRIC (4) to move PLATEN (1) forward or rearward to meet requirement on left side. Hold ECCENTRIC (4) and tighten SCREW (5).
5. Regulate Right Rear ECCENTRIC (12) to move Platen forward or rearward to meet requirement on right side. Hold ECCENTRIC (12) and tighten SCREW (13). Recheck requirement at both ends and center. Leave SCREWS (2) (3) (6) (7) (10) (11) (14) (15) loose, and make Print Hammer Adjustments #4, 5, & 8.

PRINT HAMMER ADJUSTMENTS

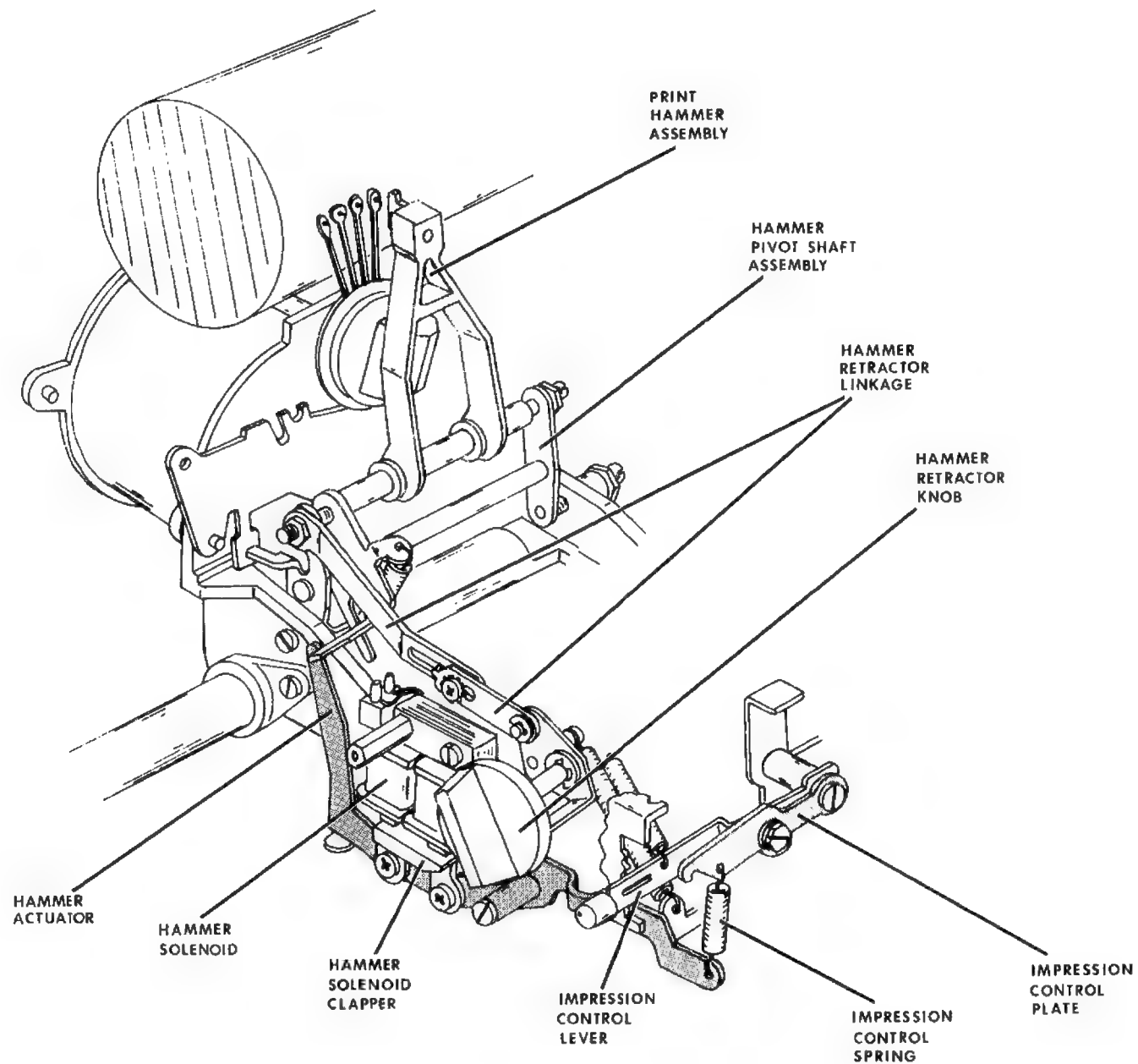


1. Hammer Pivot Shaft Position
2. Centering the Print Hammer
3. Hammer Retractor Linkage Adjustment
4. Hammer Distance from Platen with Clapper Closed
5. Air Gap Between Clapper and Solenoid Poles
6. Hammer Actuator Rest Position
7. Impression Control Spring Tension
8. Platen Height (characters "on feet")



Circled numbers in illustrations indicate adjustment points.

PRINT HAMMER



1. Hammer Pivot Shaft Position

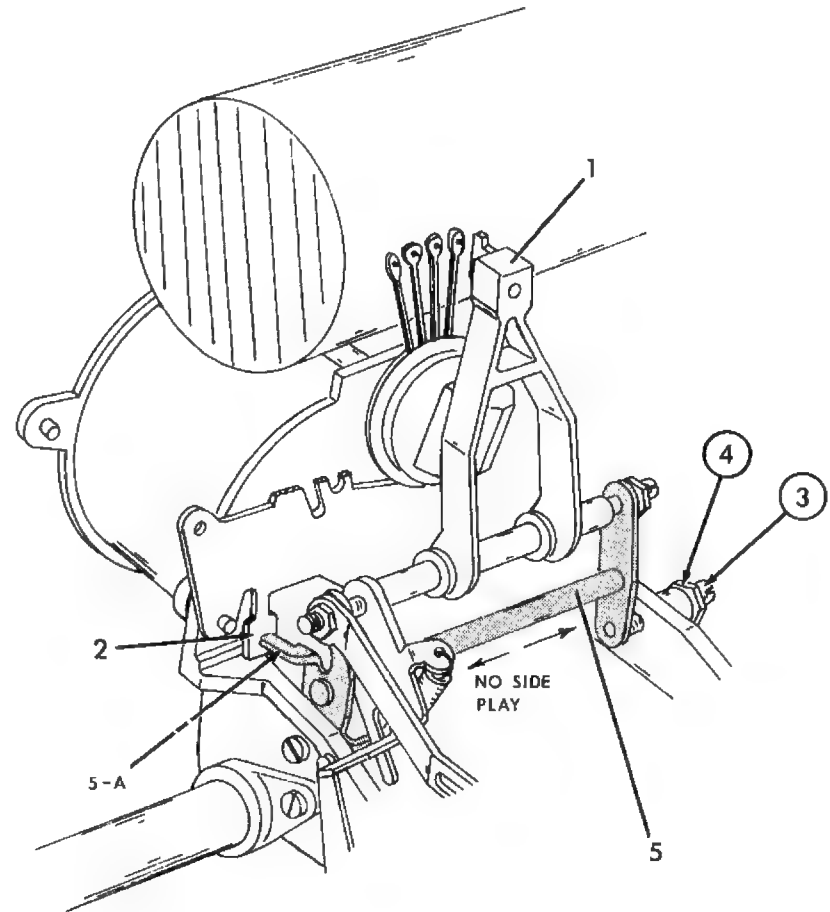
REQUIREMENT:

HAMMER PIVOT SHAFT ASSEMBLY (5) must have no side play, and should be slightly tight on its pivots.

TO CHECK: Move Pivot Shaft Assembly left and right to check side play. Retract and return HAMMER (1) to check that Pivot Shaft Assembly pivots without binding. NOTE: SHAFT ARM (5-A) should contact STOP (2) when Hammer Retractor Linkage is locked in print position.

ADJUSTMENT:

1. Raise Correction mechanism for access to PIVOT SCREW (3) and NUT (4).
2. Loosen NUT (4) and back SCREW (3) out until Pivot Shaft has slight side play. Turn SCREW (3) in just until there is no side play; then turn Screw in further 1/16 of a revolution.
3. Hold SCREW (3) and tighten NUT (4).



Print Element Adjustment #6 (Fine Alignment of the Print Element) must be correct before centering the Print Hammer.

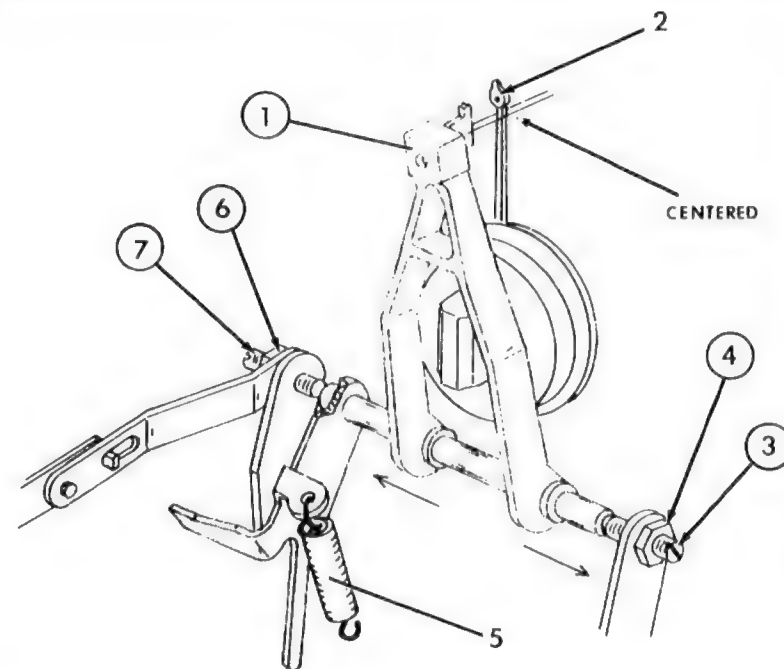
2. Centering the Print Hammer

REQUIREMENT:

- A) PRINT HAMMER (1) must be centered with characters on PRINT ELEMENT (2).
- B) HAMMER (1) must pivot freely with no more than .0015" side play.

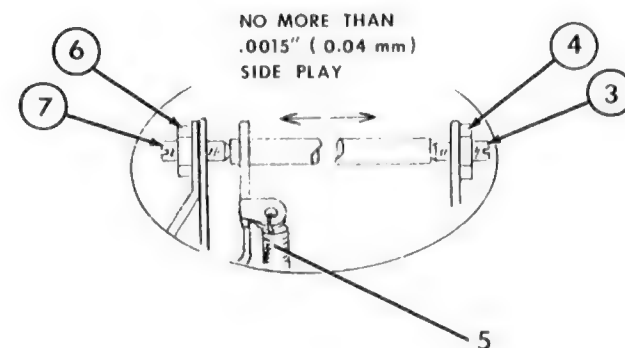
TO CHECK:

- A) Rotate the Print Element so the character "e" is at print point. Make sure the Element Gear is detented. Push the Hammer toward the character, and check alignment.
- B) Unhook SPRING (5), and check that Hammer pivots freely. Move HAMMER ASSEMBLY (1) left and right against pivots, and check side play. NOTE: Hammer Retractor Linkage must be firmly locked in print position when checking Hammer freeness and side play.



ADJUSTMENT:

1. Firmly lock Hammer Retractor Linkage into print position.
2. Unhook SPRING (5).
3. Loosen NUTS (4) & (6), and back out Left PIVOT SCREW (7) 1/2 turn.
4. Push HAMMER ASSEMBLY (1) lightly to the right and regulate Right PIVOT SCREW (3) to center Hammer with character.
5. Hold SCREW (3), and tighten Right NUT (4).
6. Regulate Left PIVOT SCREW (7) so HAMMER (1) pivots freely with no more than .0015" side play.
7. Hold SCREW (7), and tighten Left NUT (6).
8. Rehook SPRING (5).



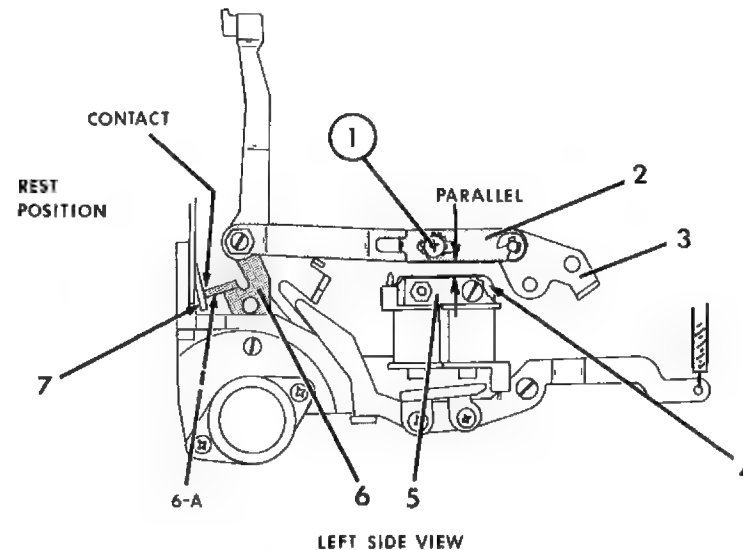
3. Hammer Retractor Linkage Adjustment

REQUIREMENT:

When Hammer mechanism is at rest position, PIVOT SHAFT ARM (6-A) should contact MOUNTING PLATE LUG (7), and bottom of RETRACTOR LINK (2) should be parallel with top of HAMMER SOLENOID (5). Retractor BRACKET (3) should not contact CASTING SURFACE (4).

ADJUSTMENT:

Loosen SCREW (1). Hold PIVOT SHAFT (6) so that ARM (6-A) is against LUG (7), and rotate Retractor Knob to meet requirement; tighten SCREW (1).



4. Hammer Distance from Platen with Clapper Closed

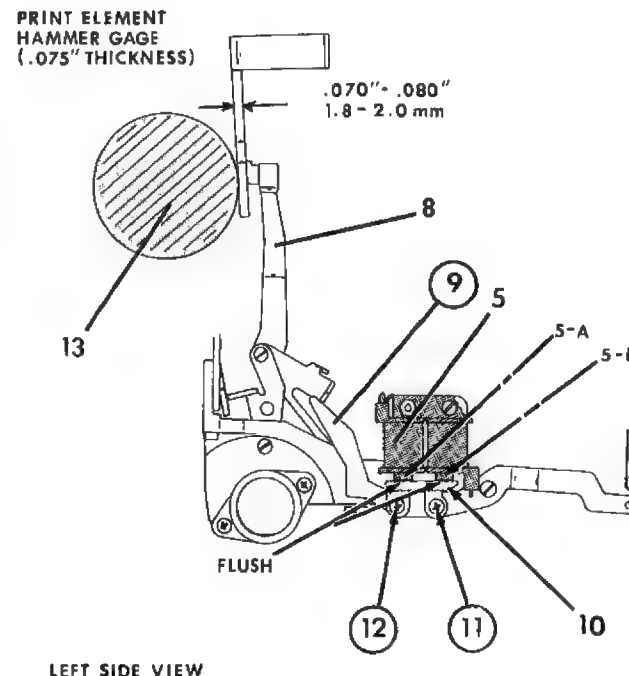
REQUIREMENT:

When closed, CLAPPER (10) should be flush against SOLENOID POLES (5-A) & (5-B), and HAMMER (8) should be .070"-.080" from PLATEN (13).

TO CHECK: Unhook Impression Control Spring. Manually push Clapper against Solenoid Poles; use thickness of Print Element/Hammer Gage to check distance between Hammer and Platen.

ADJUSTMENT:

Loosen SCREWS (11) & (12). Manually close Hammer Solenoid Clapper and position ACTUATOR (9) to meet requirement. Tighten SCREWS (11) & (12).



Air Gap Between Clapper and Solenoid Poles

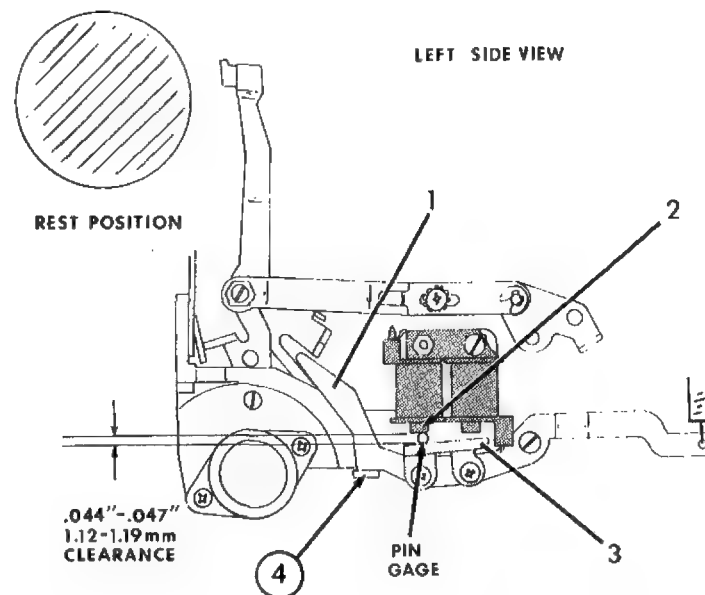
REQUIREMENT:

When Hammer mechanism is at rest, there should be .044"-.047" clearance between HAMMER CLAPPER (3) and front of REAR SOLENOID POLE (2).

TO CHECK: Set Impression Control Lever in "L" position so that Impression Control spring tension holds ACTUATOR (1) against DOWN-STOP (4).

ADJUSTMENT:

Form DOWN-STOP (4) up or down.



Hammer Actuator Rest Position

REQUIREMENT:

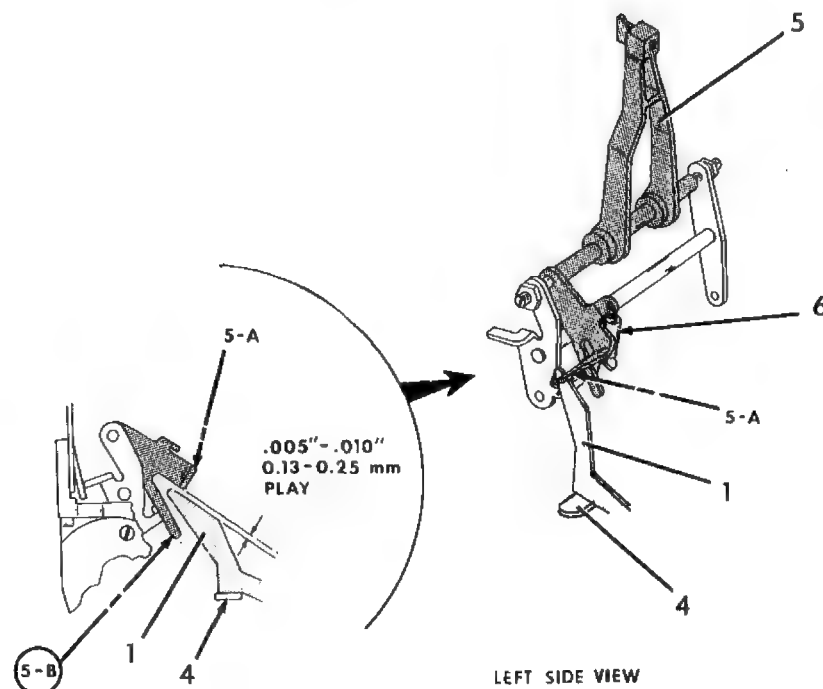
When Hammer mechanism is at rest, and ACTUATOR (1) is against DOWN-STOP (4), there should be .005"-.010" clearance between ACTUATOR (1) and HAMMER ARM (5-A).

TO CHECK: Set Impression Control Lever in "L" position so that Impression Control Spring tension holds ACTUATOR (1) against DOWN-STOP (4). Check requirement.

ADJUSTMENT:

Form STOP ARM (5-B) forward or rearward.

NOTE: HAMMER STOP ARM (5-B) must not contact SPRING (6) during entire movement of Hammer. If it does, form STOP ARM (5-B) away from SPRING (6).



7. Impression Control Spring Tension

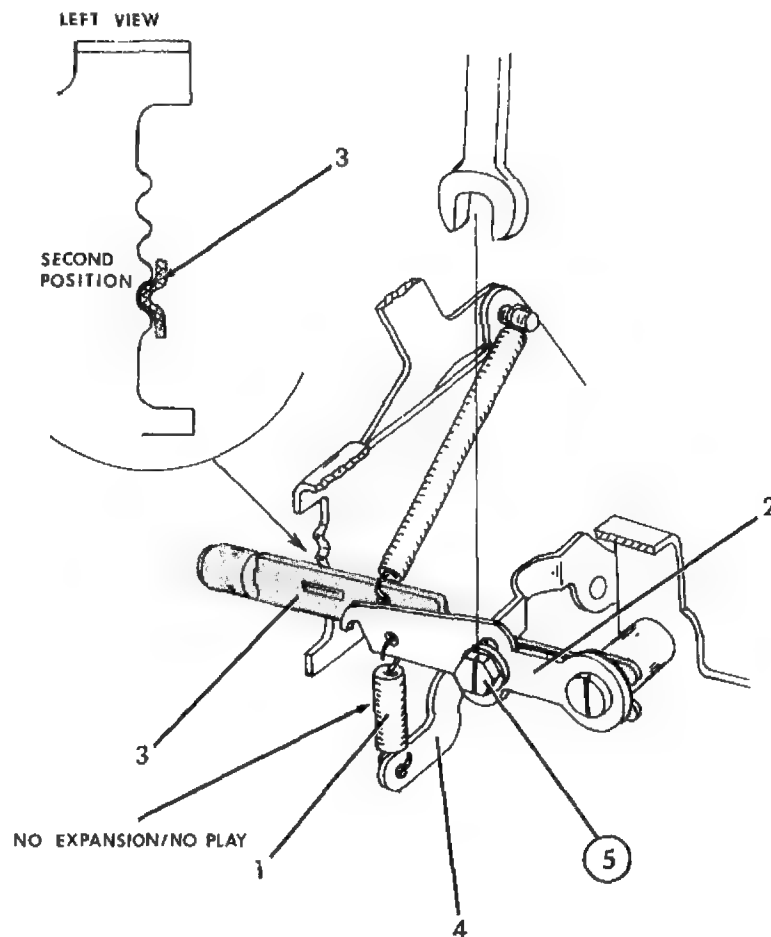
REQUIREMENT:

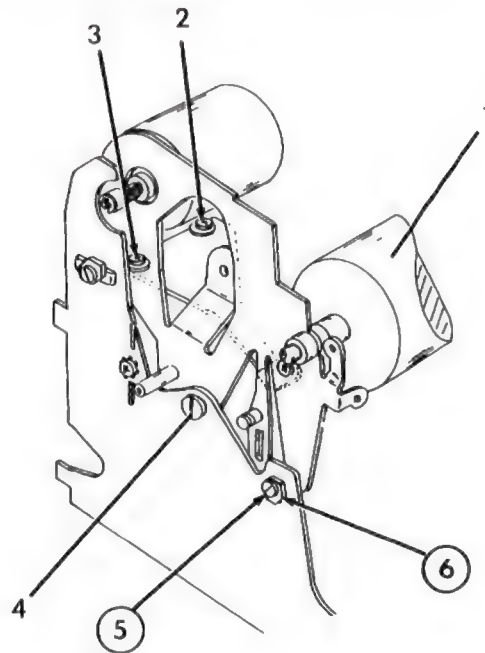
When IMPRESSION CONTROL LEVER (3) is detented in the second position from bottom, SPRING (1) should not be expanded, and there should be no play between SPRING (1), IMPRESSION CONTROL PLATE (2), and HAMMER ACTUATOR (4).

ADJUSTMENT:

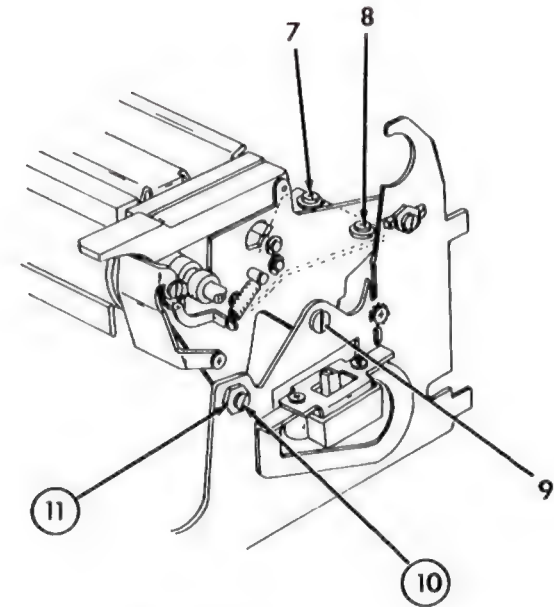
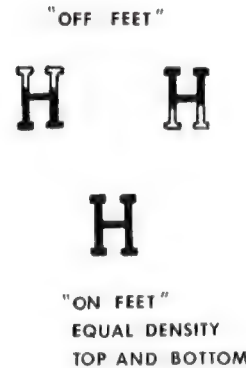
1. Move IMPRESSION CONTROL LEVER (3) to second position from bottom.
2. Loosen SCREW (5) and move IMPRESSION CONTROL PLATE (2) to meet requirement.
3. Tighten SCREW (5).

NOTE: This adjustment assures that SPRING (1) does not affect rest position of HAMMER ACTUATOR (4) when IMPRESSION CONTROL LEVER (3) is in "H" position, and that SPRING (1) is slightly expanded when LEVER (3) is in the center position. Also, this adjustment should provide acceptable print quality in at least three Impression Control settings.





LEFT SIDE VIEW



RIGHT SIDE VIEW

Print Element Adjustment #7 (Element Off Platen) must be correct before making Platen Height Adjustment.

8. Platen Height (Characters "on feet")

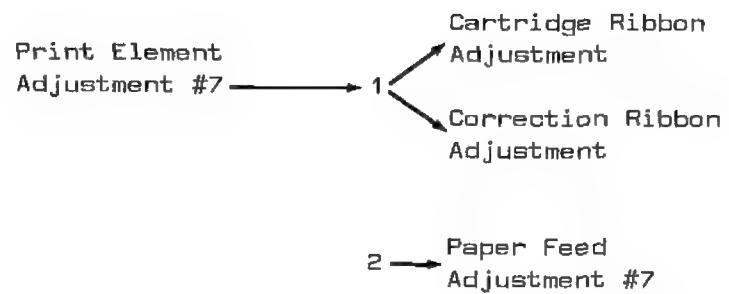
REQUIREMENT: Characters should print "on feet" (equal density top and bottom) along entire length of Carrier travel.

TO CHECK: Install Fabric Ribbon Cartridge, and set Impression Control Lever at "L" position. Type "H's" at left and right ends of Platen.

ADJUSTMENT:

1. Loosen SCREWS (2) (3) (4) (5) (7) (8) (9) (10).
2. Move Carrier to Left End of PLATEN (1) and regulate Left Front ECCENTRIC (6) to meet requirement. Hold ECCENTRIC (6) and tighten SCREW (5); then tighten SCREW (4).
3. Move Carrier to Right End of PLATEN (1) and regulate Right Front ECCENTRIC (11) to meet requirement. Hold ECCENTRIC (11) and tighten SCREW (10); then tighten SCREW (9).
4. Tighten SCREWS (2) (3) (7) (8).

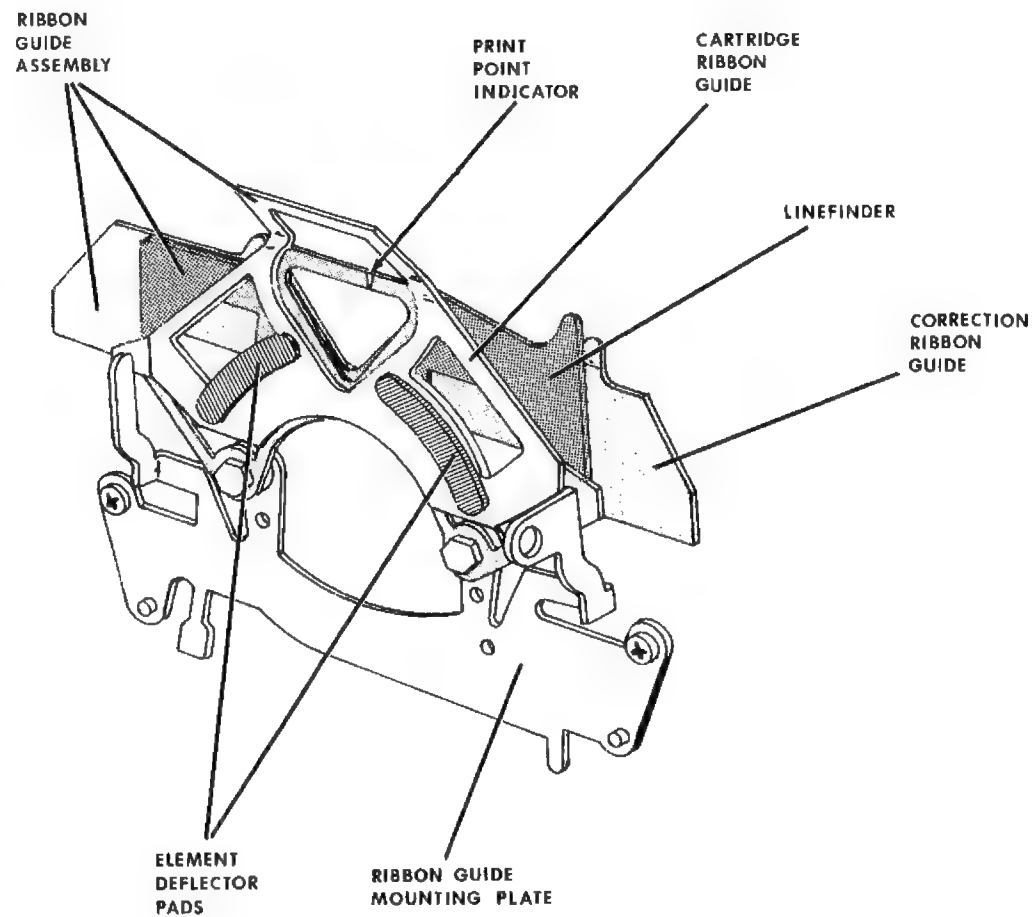
RIBBON GUIDE ADJUSTMENTS



1. Ribbon Guide Mounting Plate Adjustment
2. Linefinder Alignment

○ Circled numbers in the illustrations indicate adjustment points.

RIBBON GUIDE



Print Element Adjustment #7 must be correct before making this adjustment.

1. Ribbon Guide Mounting Plate Adjustment

REQUIREMENT:

With a paper pack .020"-.044" thick (approximately 6 sheets of 20 pound bond paper) inserted in Platen:

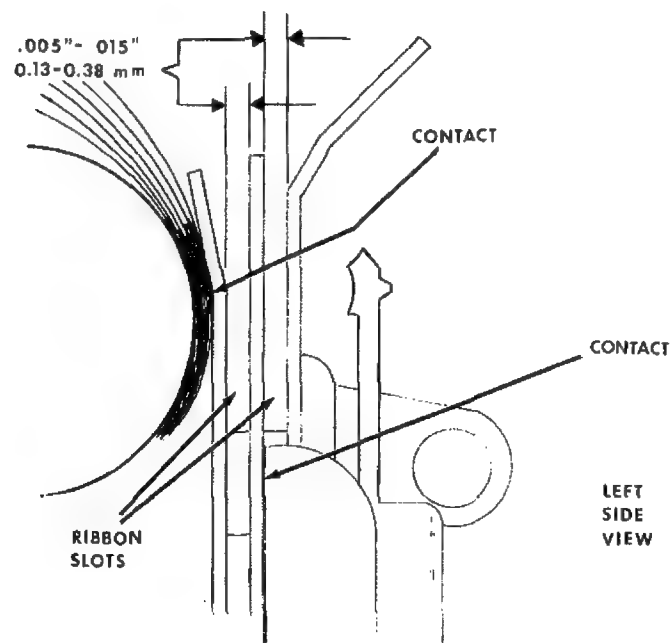
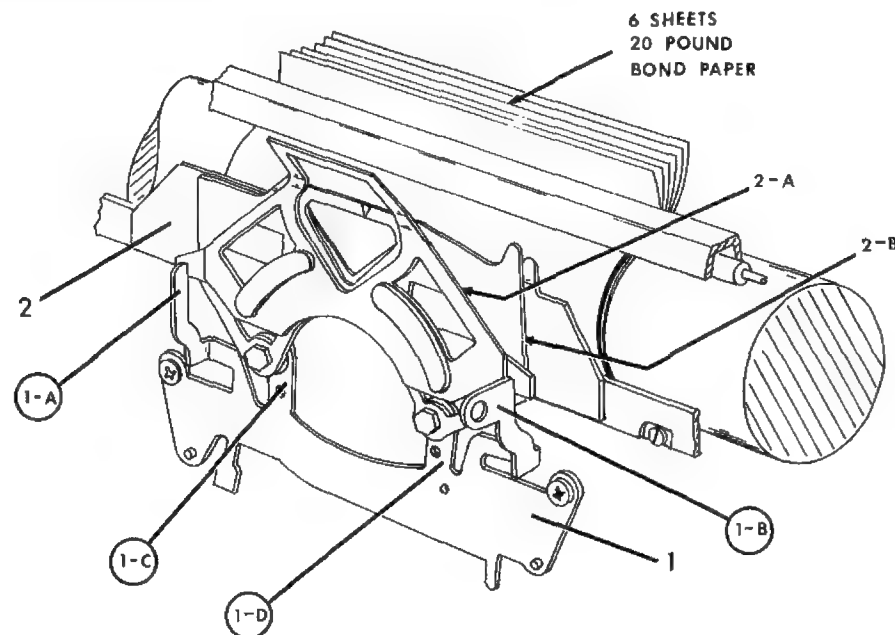
- A) Rear Plate of CORRECTION RIBBON GUIDE (2) should contact paper pack.
- B) Both the Cartridge Ribbon SLOT (2-A) and the Correction Ribbon SLOT (2-B) should be .005"-.015" wide (check at full depth with Shim).
- C) ARMS (1-A) and (1-B) should contact Front surface of Ribbon Guide Assembly.

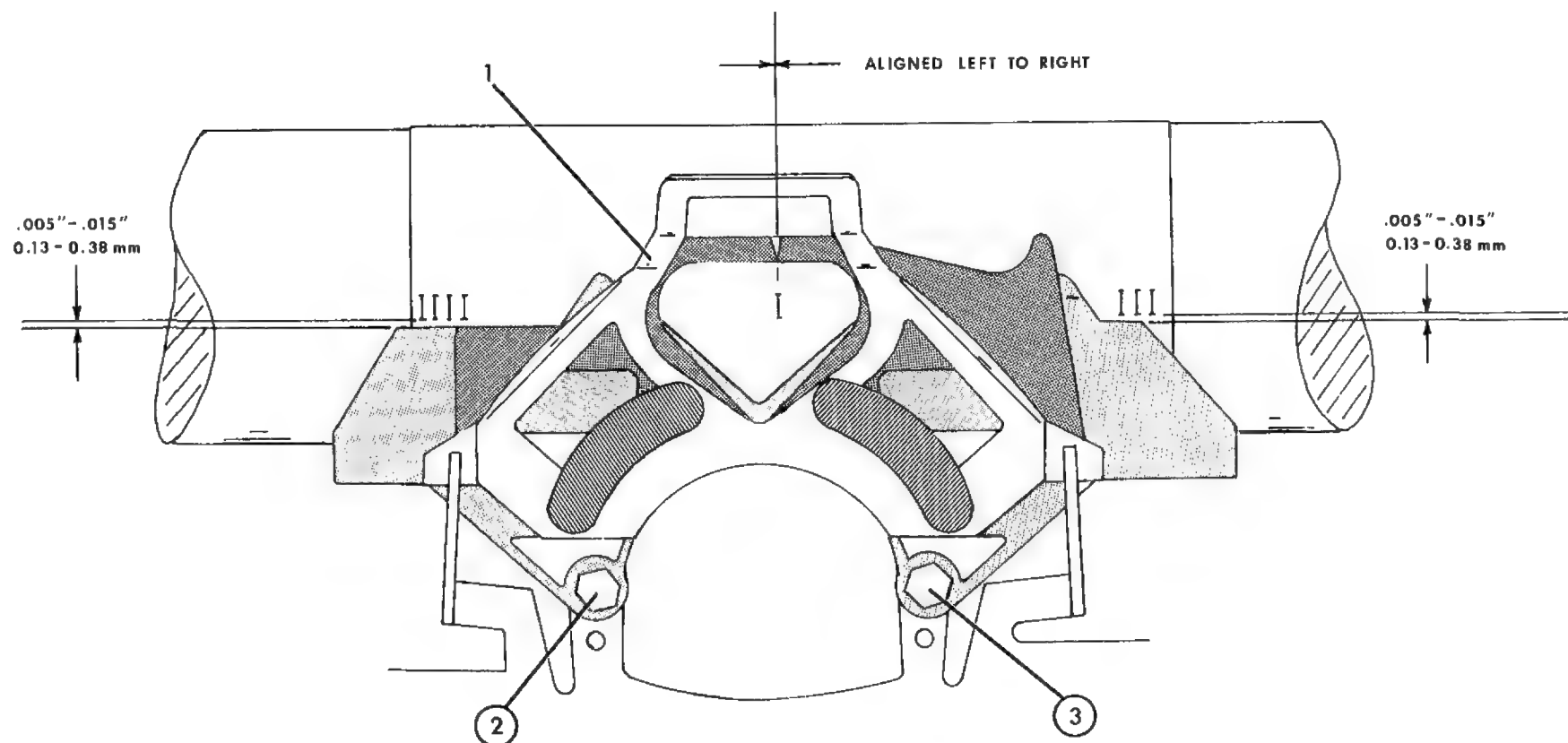
ADJUSTMENT:

With specified paper pack inserted, first form Ribbon Guide Mounting Plate ARMS (1-A) and (1-B) forward so they clear Ribbon Guide Assembly. Then use a .125" diameter pin wrench in the holes of EARS (1-C) and (1-D) to form Ears so that rear side of Correction Guide just contacts paper pack. Then reform ARMS (1-A) and (1-B) rearward so they just contact front surface of Ribbon Guide Assembly.

NOTE 1: Both Ribbon Slots in a free standing Ribbon Guide Assembly should be .005"-.015" wide. If not, replace the Ribbon Guide Assembly.

NOTE 2: There should be .005"-.020" clearance between front of Element Deflector Pads and rear of Print Element Petals. If not, check this adjustment and Print Element adjustment #7. If necessary, replace Ribbon Guide Assembly.





2. Linefinder Alignment

REQUIREMENT: The RIBBON GUIDE ASSEMBLY (1) should align vertically and horizontally with the printed line of write as shown.

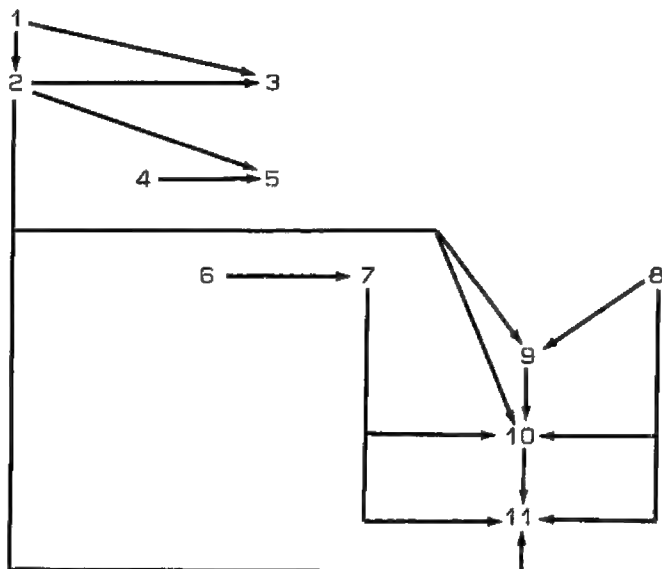
ADJUSTMENT:

Position RIBBON GUIDE ASSEMBLY (1) with attaching SCREWS (2) & (3).

CARTRIDGE RIBBON ADJUSTMENTS

RIBBON DRIVE ADJUSTMENTS

1. Ribbon Motor Rotor End Play
2. Ribbon Cam/Phase 1 Alignment
3. Ribbon Optical Sensor Position (left to right)
4. Ribbon Optical Sensor Position (front to rear)
5. Ribbon Optical Sensor Alignment

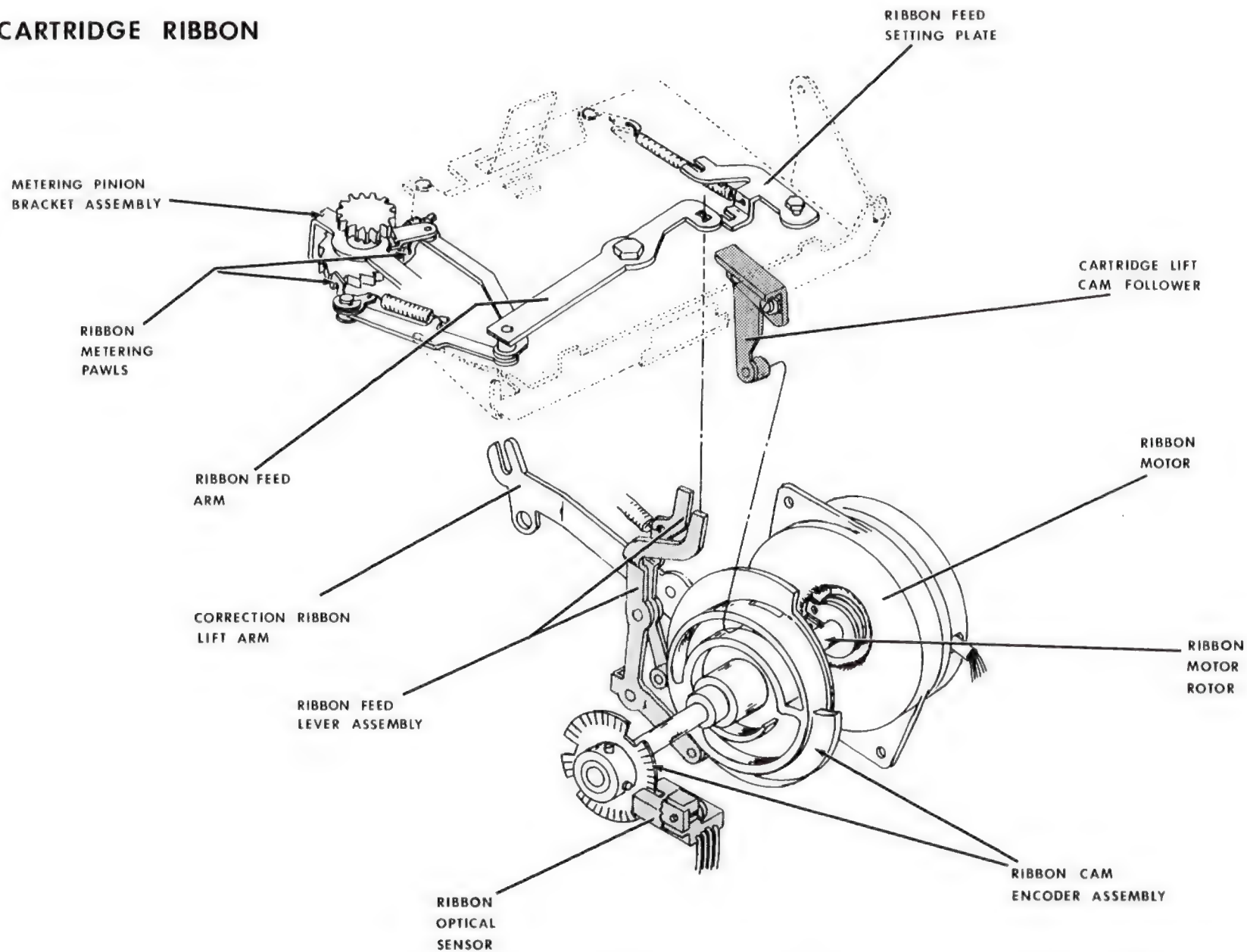


CARTRIDGE RIBBON LIFT AND FEED ADJUSTMENTS

6. Metering Pinion Height
7. Metering Pinion Gear/Cartridge Gear Mesh
8. Position of Cartridge Rocker
9. Ribbon Lift
10. Ribbon Feed Setting Plate
11. Bi-directional Feed

○ Circled numbers in the illustrations indicate adjustment points.

CARTRIDGE RIBBON



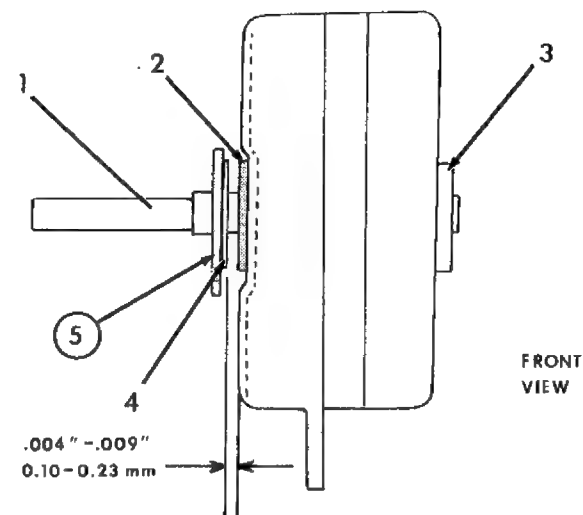
1. Ribbon Motor Rotor End Play

REQUIREMENT:

Ribbon Motor ROTOR (1) should be free in BEARINGS (2) & (3), and have .004"-.009" end play.

TO CHECK: Bias Motor ROTOR (1) to the left and insert .005" U-shaped Shim between WASHER (4) and left Rotor BEARING (2). RETAINING RING (5) should hold WASHER (4) firmly against Shim.

ADJUSTMENT: Expand RETAINING RING (5) with Retaining Ring Pliers and position Ring left or right on Rotor Shaft. Check requirement.



2. Ribbon Cam/Phase 1 Alignment

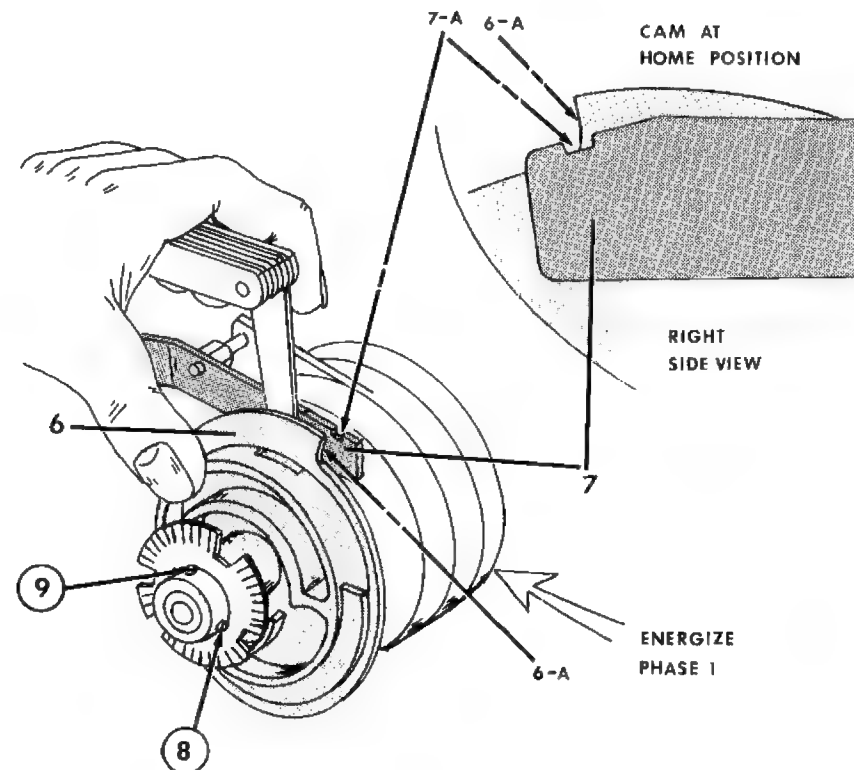
REQUIREMENT:

With Ribbon Cam at rest in Home position:

- A) There should be .019"-.029" clearance between CAM (6) and upper Motor Mount BRACKET (7).
- B) EDGE (6-A) of CAM (6) should align with WINDOW (7-A) when Phase 1 of the Ribbon Motor is energized.

TO CHECK: Rotate Ribbon Cam to Home position. Measure gap between Ribbon CAM (6) and Upper MOTOR MOUNT BRACKET (7) with a Shim. Energize Ribbon Motor Phase 1, and observe EDGE (6-A) of RIBBON CAM (6).

ADJUSTMENT: Loosen SET SCREWS (8) & (9) and energize Ribbon Motor Phase 1. Position Cam left or right on Rotor Shaft to meet clearance requirement. Then rotate Cam on Shaft so that EDGE (6-A) is in center of WINDOW (7-A). Tighten Screws.



3. Ribbon Optical Sensor Position (left to right)

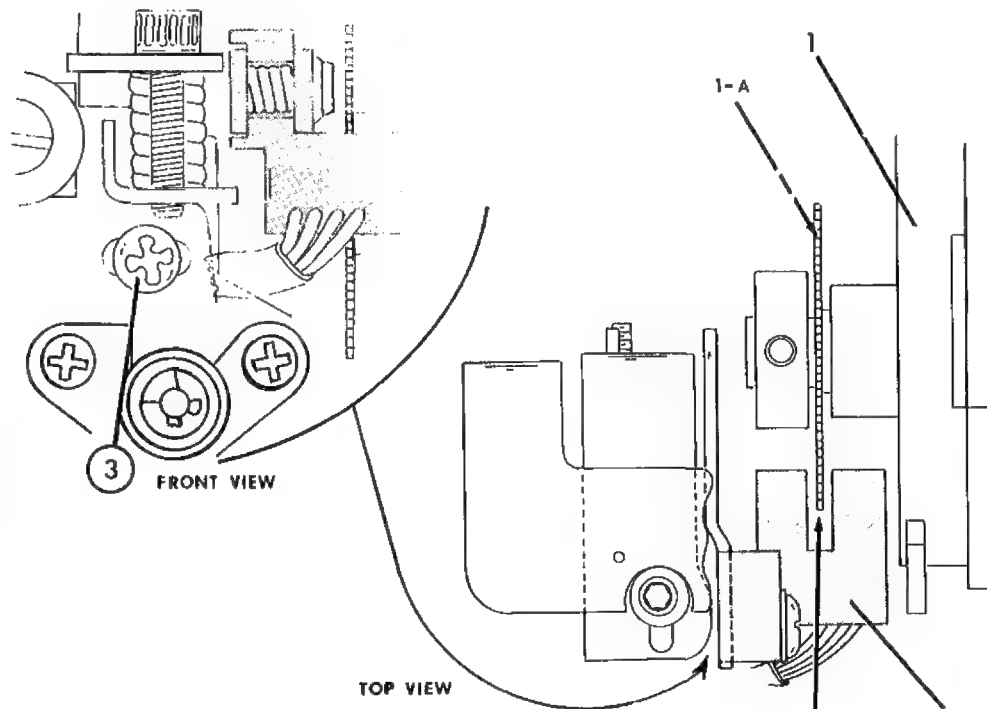
REQUIREMENT:

ENCODER DISC (1-A) should be centered (side to side) in Slot of RIBBON OPTICAL SENSOR (2).

TO CHECK: Rotate RIBBON CAM (1) through the Lift, Feed, and Correction cycles, and check that Disc is approximately centered in Slot. It should not contact the Sensor housing.

ADJUSTMENT:

Loosen SCREW (3), and position Ribbon Optical Sensor so that ENCODER DISC (1-A) is centered. Tighten SCREW (3).



4. Ribbon Optical Sensor Position (front to rear)

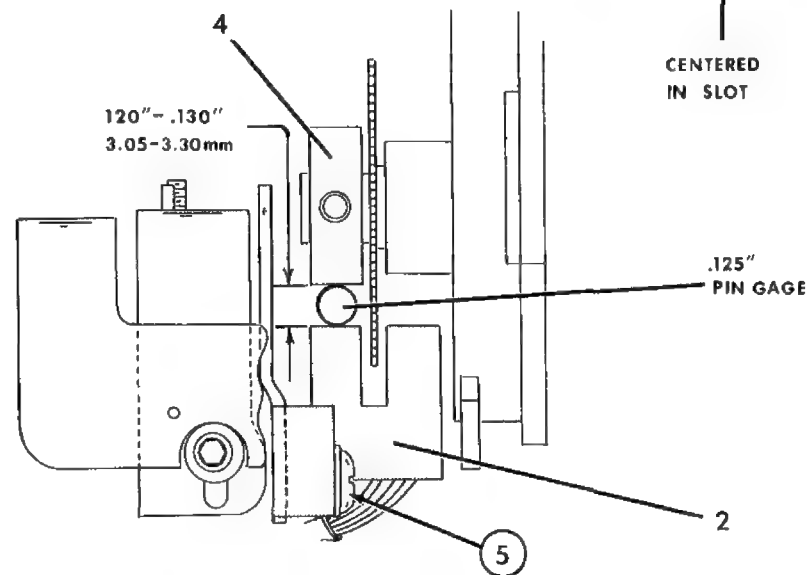
REQUIREMENT:

There should be .120"-.130" clearance between rear of RIBBON OPTICAL SENSOR (2) and COLLAR (4).

TO CHECK: Rotate Ribbon Cam and check gap between Rear Housing of Ribbon Optical Sensor and front area (between Set Screws) of Ribbon Cam Collar. Use .125" Pin Gage.

ADJUSTMENT:

Loosen SCREW (5), and slide OPTICAL SENSOR (2) rearward until it contacts Pin Gage. Tighten SCREW (5).



5. Ribbon Optical Sensor Alignment

REQUIREMENT:

- A) When Ribbon CAM (1) is at Phase 1 Home position, the Optical SENSOR (2) should be centered over WINDOW (1-A) of Encoder Disc so that output voltage of Optical Sensor is the highest possible. (Use an Electronic Voltmeter--see PC Board Component Diagram).
- B) When Ribbon CAM (1) is rotated to the Phase 1 position on either side of Home position, the Optical SENSOR (2) output voltage should be the lowest possible voltage and approximately equal at each Phase 1 position.

TO CHECK:

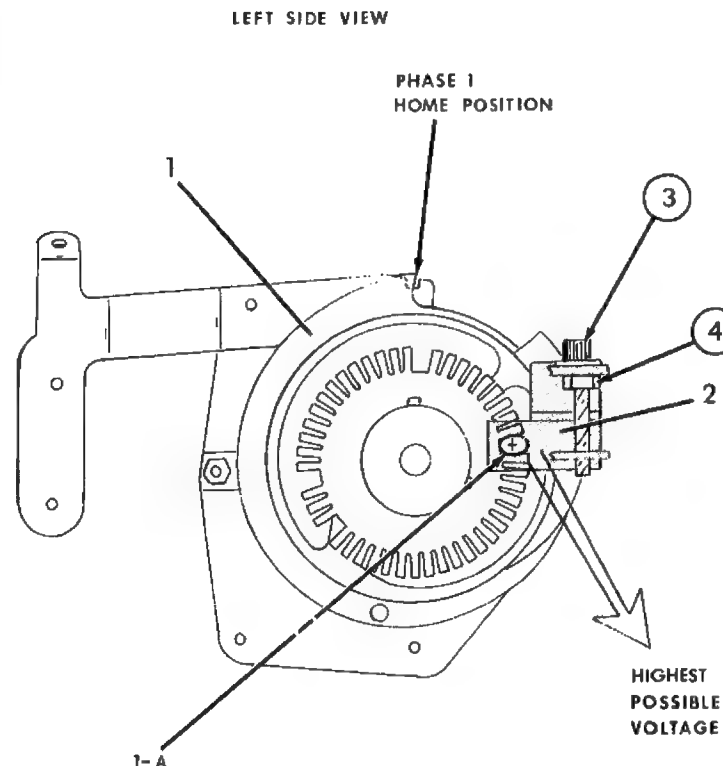
- 1) Remove Correction Ribbon Take-up Spool and Cartridge Rocker to assure accuracy of adjustment.
- 2) Make sure Ribbon Cam is at Home position; then energize Ribbon Motor Phase 1. Using an Electronic Voltmeter, verify that output voltage of Optical Sensor is the highest possible. Slightly rotate Ribbon Cam in one direction, then the other. Voltage should not rise as Cam is rotated.
- 3) Energize Ribbon Motor Phase 1 and manually rotate Ribbon Cam top forward to the first Black Lift Phase 1. Then rotate Cam back to Home and then top rearward to the first Correction Lift Phase 1. Note Optical Sensor output voltages at both Phase 1 positions; voltage readings should be the lowest possible and approximately equal.

NOTE: Shield the Sensor from direct light when checking requirement.

ADJUSTMENT:

Loosen NUT (4). Regulate SCREW (3) to align Optical Sensor. Hold SCREW (3) and tighten NUT (4).

NOTE: The highest possible voltage should be at least 1.7 volts. The lowest possible voltage should be no higher than .050 volts.



BLACK LIFT = TOP FORWARD
CORRECTION LIFT = TOP REARWARD

6. Metering Pinion Height

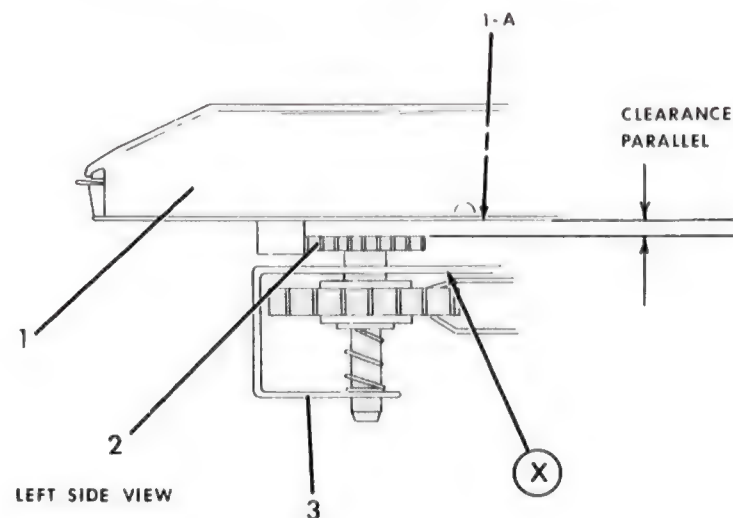
REQUIREMENT:

With CARTRIDGE (1) latched in Cartridge Rocker Assembly, the top surface of PINION (2) should be parallel with bottom surface of CARTRIDGE (1-A).

NOTE: Requirement can be checked with Cartridge Rocker mounted or dismounted. If Gears do not mesh, check Adjustment #7 first.

ADJUSTMENT:

1. Remove Cartridge Rocker, and install Cartridge.
2. Form METERING PINION BRACKET (3) up or down at "X" to meet requirement.
3. Check Adjustment #7 before reassembling Cartridge Rocker to Carrier.



7. Metering Pinion Gear/Cartridge Gear Mesh

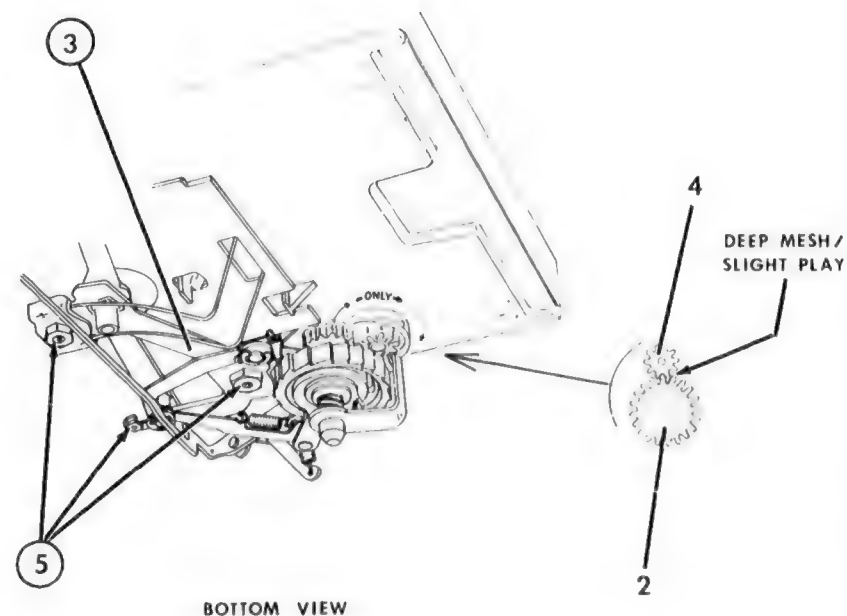
REQUIREMENT:

RIBBON METERING PINION GEAR (2) should mesh with CARTRIDGE FEED GEAR (4) so there is slight play between the two Gears.

TO CHECK: Lightly rotate PINION GEAR (2) to check for slight play. Check with several Fabric and Film Ribbon Cartridges.

ADJUSTMENT:

1. Remove Cartridge Rocker, and install Cartridge.
2. Loosen NUTS (5) and position METERING PINION BRACKET ASSEMBLY (3) forward or rearward to obtain proper Gear mesh. Tighten NUTS (5).
3. Reassemble Rocker to Carrier.



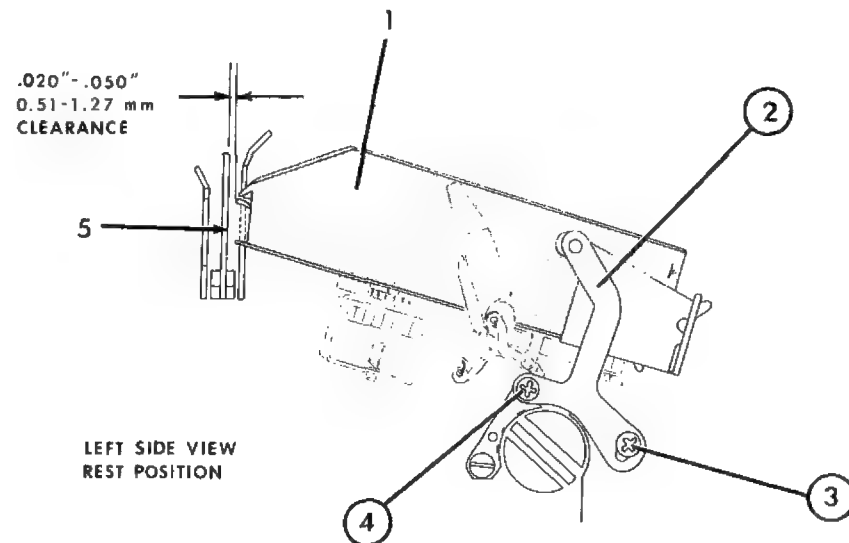
8. Position of Cartridge Rocker

REQUIREMENT:

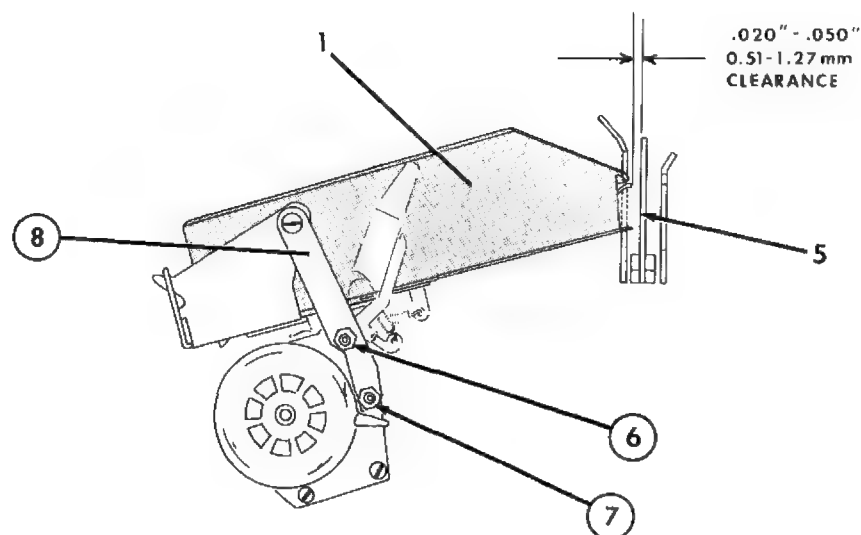
With RIBBON CARTRIDGE (1) in rest position and Ribbon Motor at Phase 1 Home position, there should be .020"-.050" clearance between rear edge of CARTRIDGE (1) and front of LINEFINDER (5) on both sides of the Cartridge.

ADJUSTMENT:

1. Loosen SCREWS (3) & (4) and NUTS (6) & (7).
2. Position ROCKER SUPPORT BRACKETS (2) & (8) forward or rearward to obtain requirement.
3. Tighten SCREWS (3) & (4) and NUTS (6) & (7).



LEFT SIDE VIEW
REST POSITION



RIGHT SIDE VIEW
REST POSITION

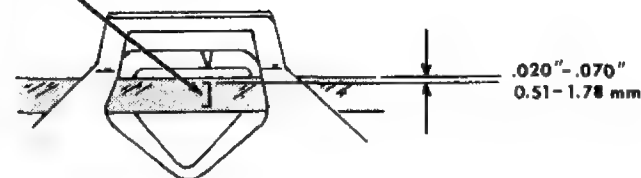
9. Ribbon Lift

REQUIREMENT:

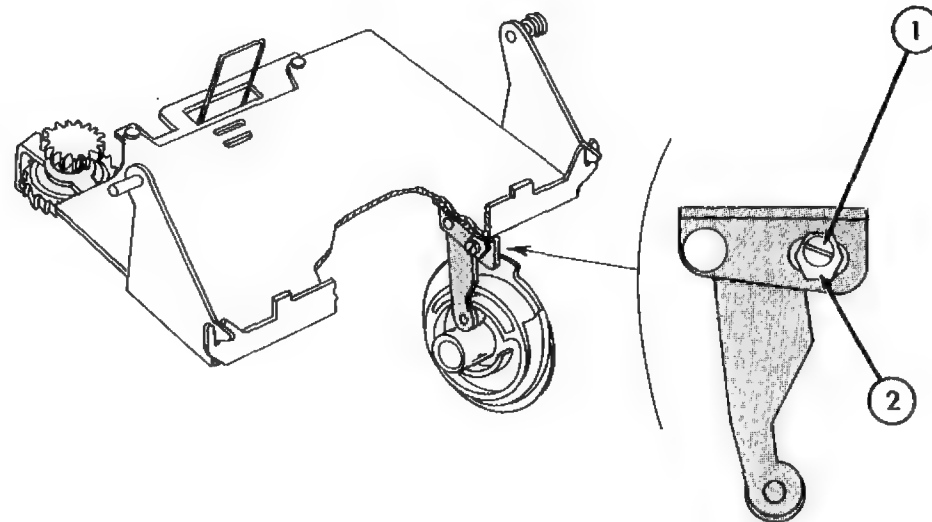
The top of a typed square bracket on a Script Print Element should be .020"-.070" from the top of Film Ribbon.

TO CHECK: Insert Script Print Element and Film Ribbon Cartridge (make sure that Ribbon is taut). Type several square brackets and check requirement.

TYPED SQUARE BRACKET
(SCRIPT PRINT ELEMENT)

ADJUSTMENT:

Loosen SCREW (1), and regulate ECCENTRIC (2) to adjust lift of Cartridge Rocker.



10. Ribbon Feed Setting Plate

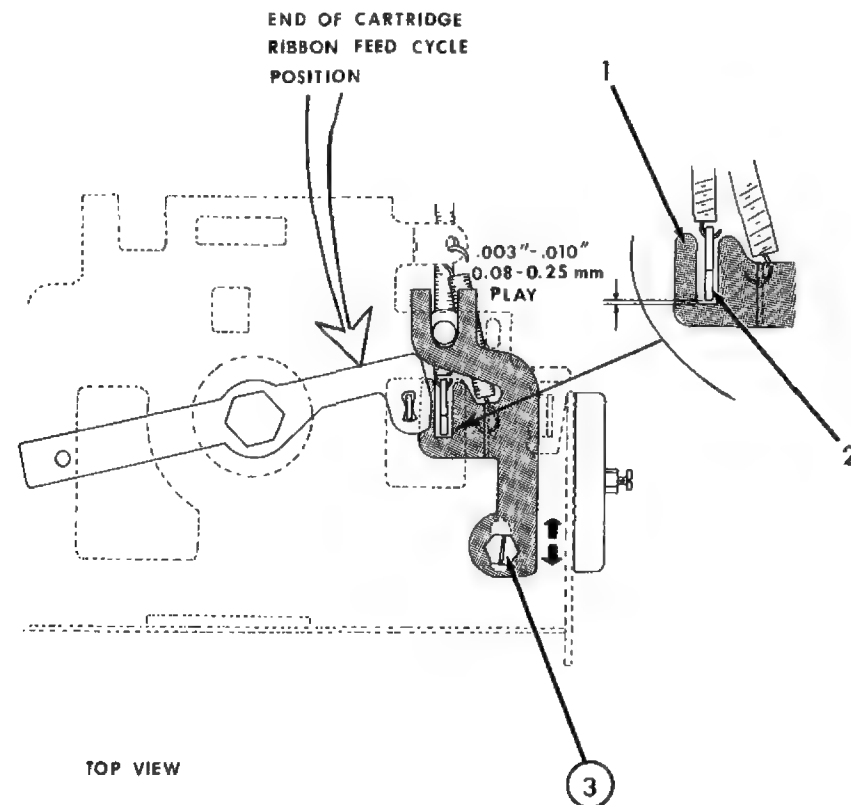
REQUIREMENT:

When Ribbon Cam is at the end of Cartridge Ribbon Feed Cycle, FEED LEVER (2) should have .003"-.010" forward play.

TO CHECK: Manually rotate Ribbon Cam top forward to the end of travel. Check for required play.

ADJUSTMENT:

Loosen NUT (3) and position SETTING PLATE (1) to meet requirement. Tighten NUT (3).



11. Bi-directional Feed

REQUIREMENT:

Black Ribbon FEED PAWLS (1) & (2) should feed equal amounts of Ribbon in both directions.

TO CHECK UNDER POWER: Insert a 10 Pitch Print Element and Film Ribbon Cartridge. Type several underscores in the repeat mode. Check that each underscore is evenly spaced on Ribbon.

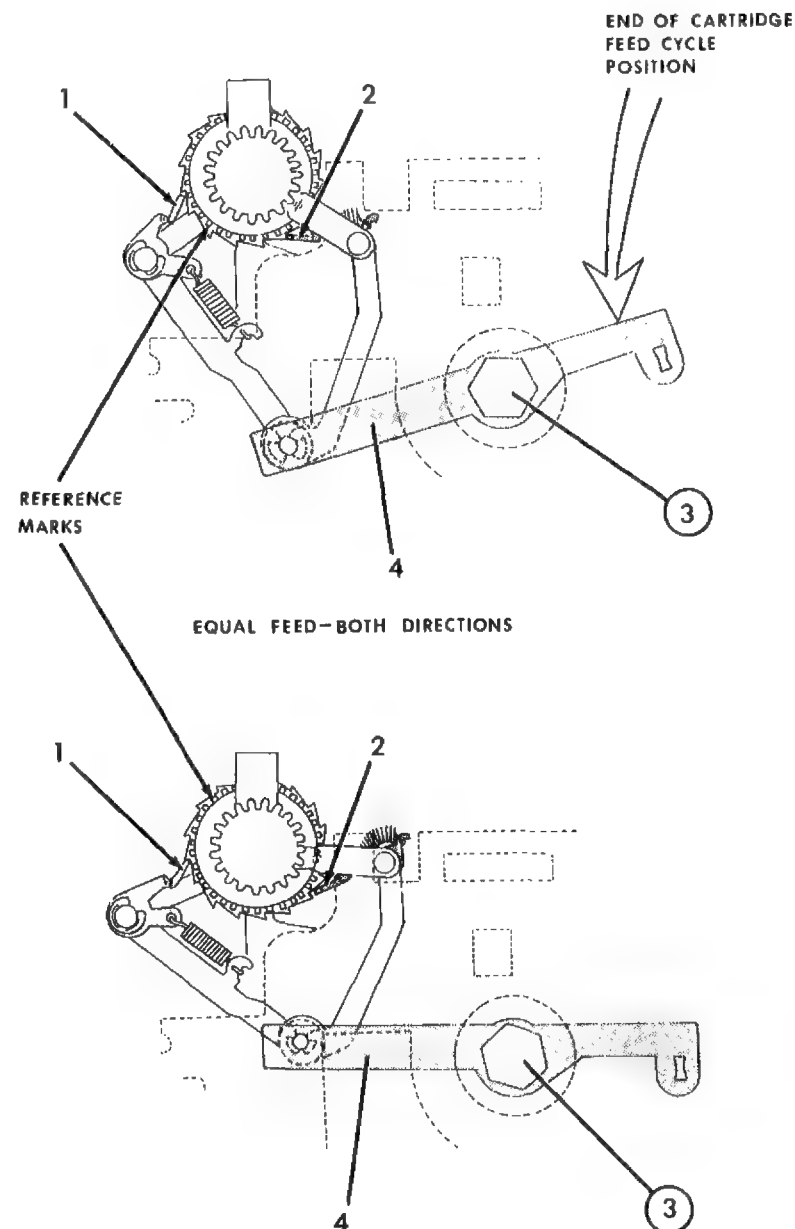
TO CHECK MANUALLY:

- 1) With Ribbon Cam at Home position, manually rotate Ribbon Cam top forward to the end of Cartridge Ribbon Feed Cycle.
- 2) Rotate Ribbon Cam top rearward only to the end of feed travel and observe the amount FEED PAWL (2) travels. To check amount of travel, observe reference marks on teeth of Pinion Gear.
- 3) Again, rotate Ribbon Cam top forward to the end of Cartridge Ribbon Feed Cycle and observe the amount FEED PAWL (1) travels. Repeat and compare amount of travel in both directions.

ADJUSTMENT:

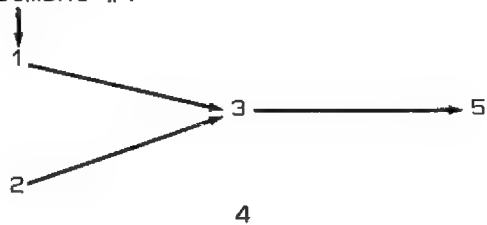
Loosen NUT (3) and move FEED ARM (4) forward or rearward. Tighten NUT (3). Requirement should be rechecked under power.

NOTE: Slight adjustment to Feed Arm will quickly change amount of Feed Pawl travel.



CORRECTION RIBBON ADJUSTMENTS

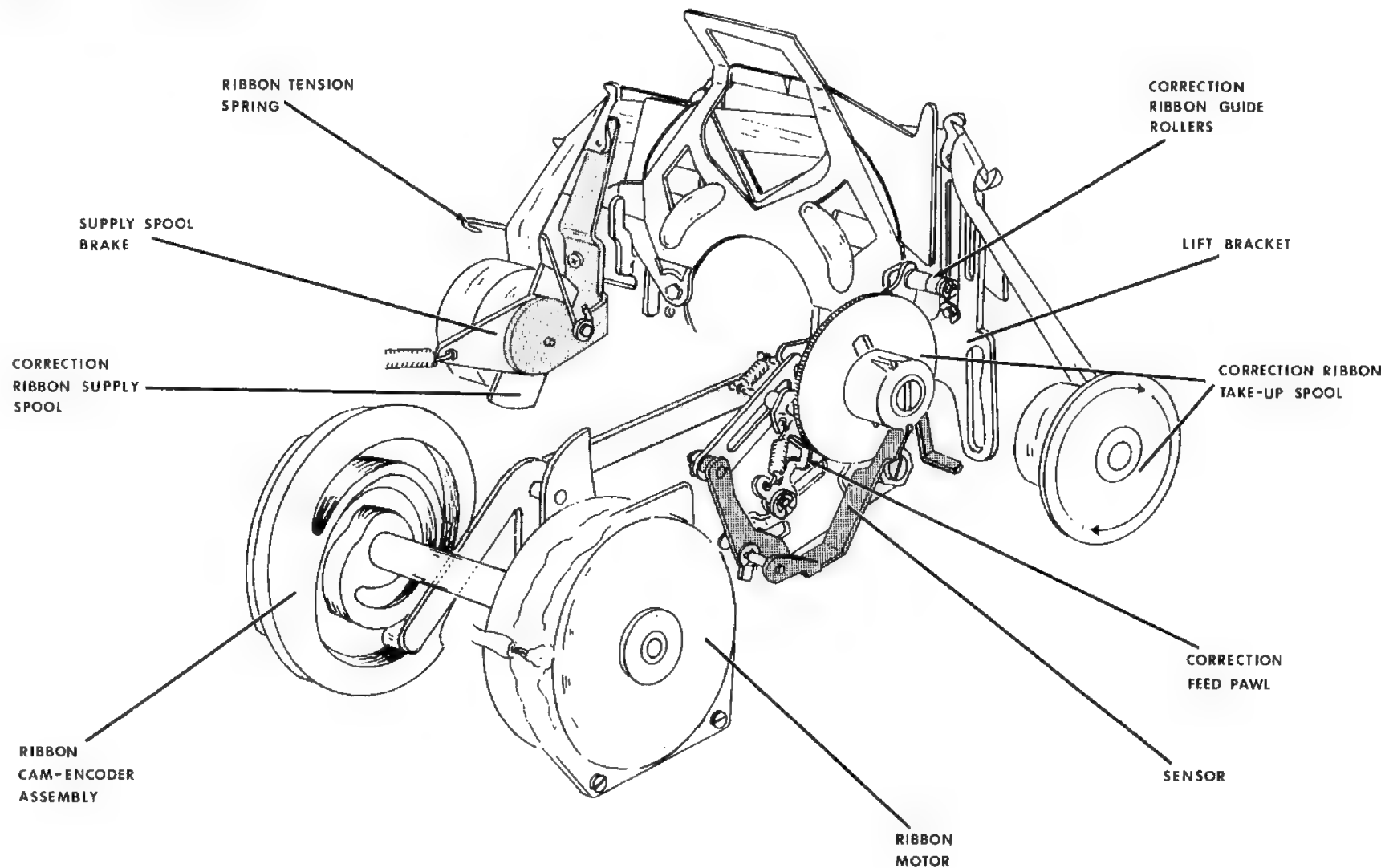
Ribbon Guide
Adjustment #1

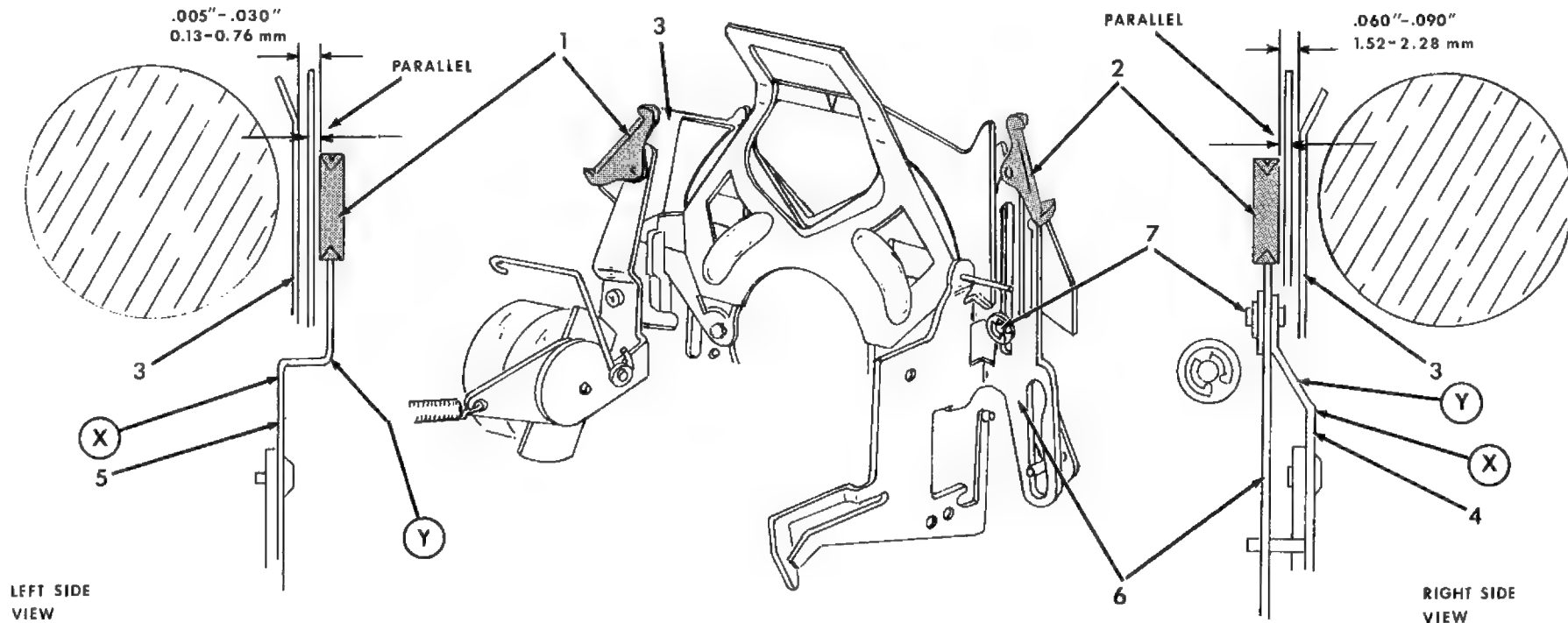


1. Correction Ribbon Corner Guides
2. Correction Ribbon Tension Spring
3. Correction Ribbon Tracking on Take-up Spool
4. Correction Ribbon Feed
5. Correction Ribbon Lift

○ Circled numbers in the illustrations
indicate adjustment points.

CORRECTION RIBBON





Ribbon Guide Adjustment #1 must be correct before making this adjustment.

1. REQUIREMENT:

- A. Rear surface of Left RIBBON CORNER GUIDE (1) should be .005"-.030" in front of CORRECTION RIBBON GUIDE (3) when there is no Correction Ribbon in the Guide.
- B. Rear surface of Right RIBBON CORNER GUIDE (2) should be .060"-.090" in front of CORRECTION RIBBON GUIDE (3) when there is no Correction Ribbon in the Guide.

ADJUSTMENT: Form CORRECTION RIBBON BRACKETS (4) & (5) forward or rearward at "X."

NOTE: Check that CORNER GUIDES (1) & (2) remain parallel with Linefinder. If necessary, form BRACKETS (4) & (5) at "Y."

NOTE: Check that LIFT BRACKET (6) does not bind on STUD (7) after making adjustment.

NOTE: This adjustment helps prevent Correction Ribbon cover-up material from flaking off and building up on Ribbon Guide surfaces.

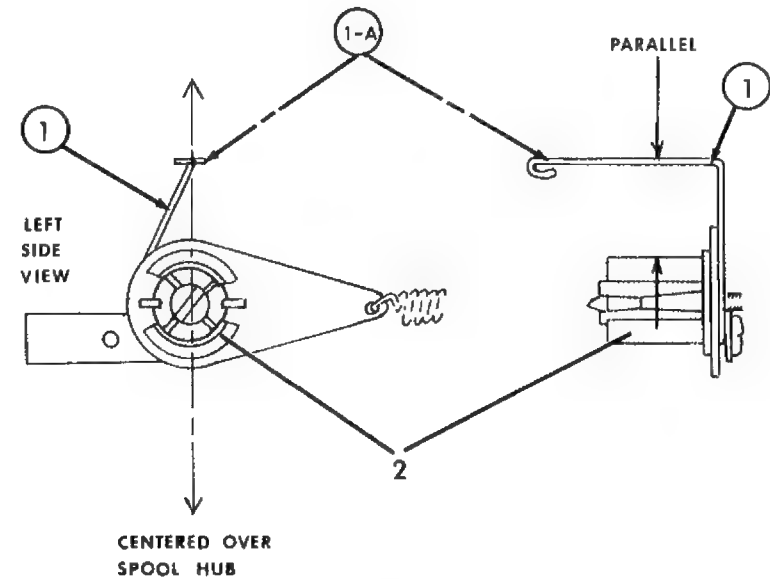
2. Correction Ribbon Tension Spring

REQUIREMENT:

With Ribbon slack so there is no tension on TENSION SPRING (1), TENSION SPRING ARM (1-A) should be centered and parallel over SUPPLY SPOOL HUB (2).

ADJUSTMENT:

Manually form TENSION SPRING (1) to meet requirement.



3. Correction Ribbon Tracking on Take-Up Spool

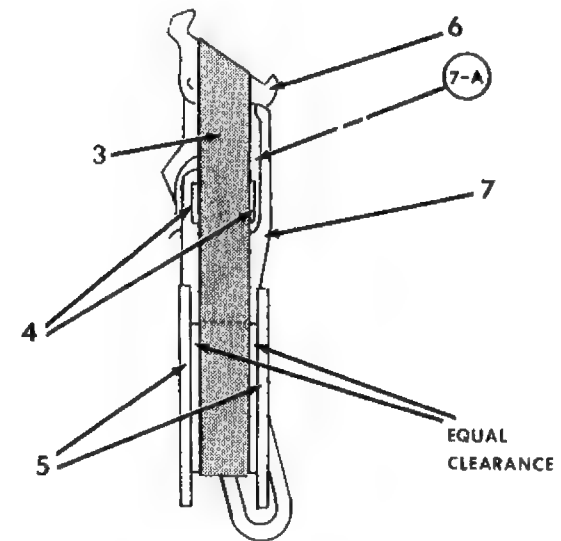
REQUIREMENT:

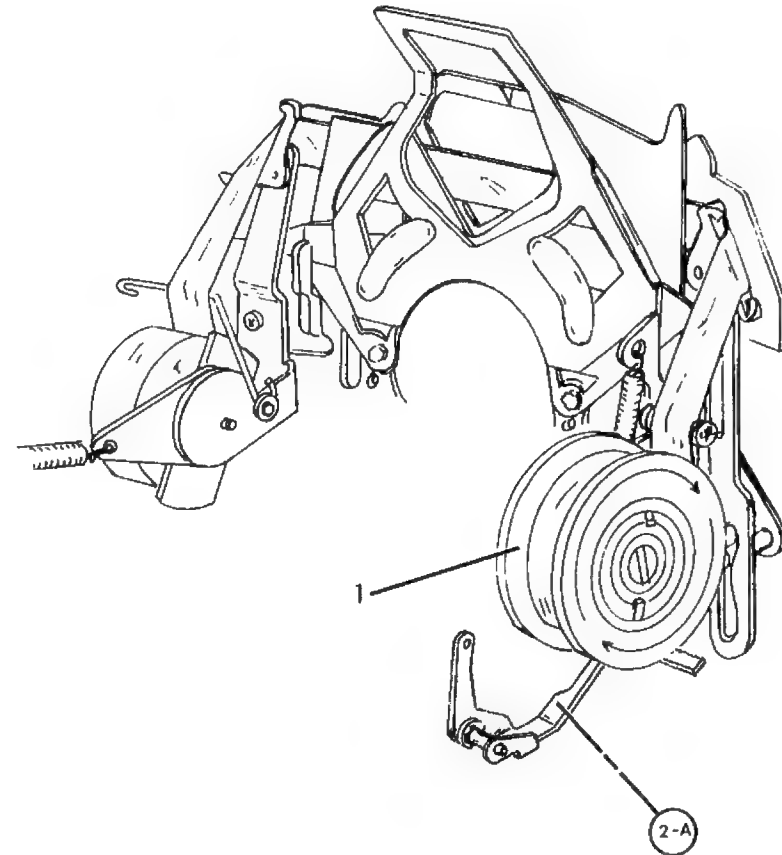
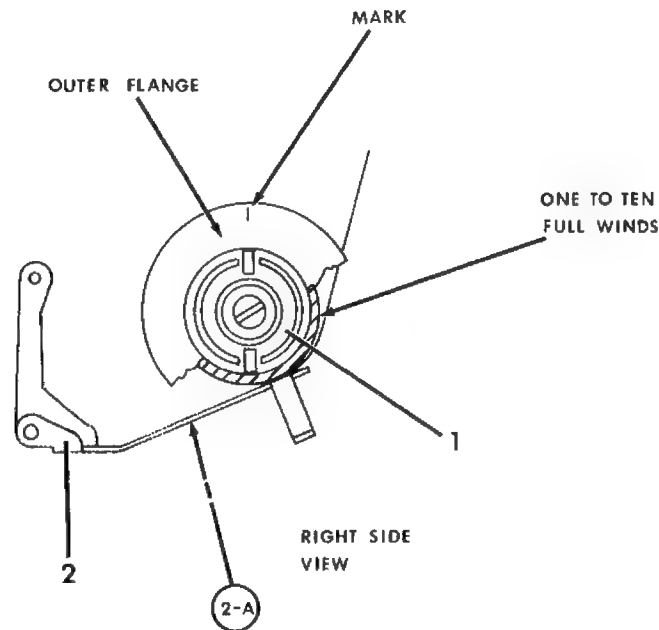
CORRECTION RIBBON (3) should track so it is centered between FLANGES (4) of Guide Roller and FLANGES (5) of Take-Up Spool.

TO CHECK: Use Lift-Off Correction Ribbon. Cycle the Correction mechanism several times under power; check requirement.

ADJUSTMENT:

Open or close SLOT (7-A) to position CORNER GUIDE (6) so that Ribbon tracks correctly on Take-Up Spool.





4. Correction Ribbon Feed

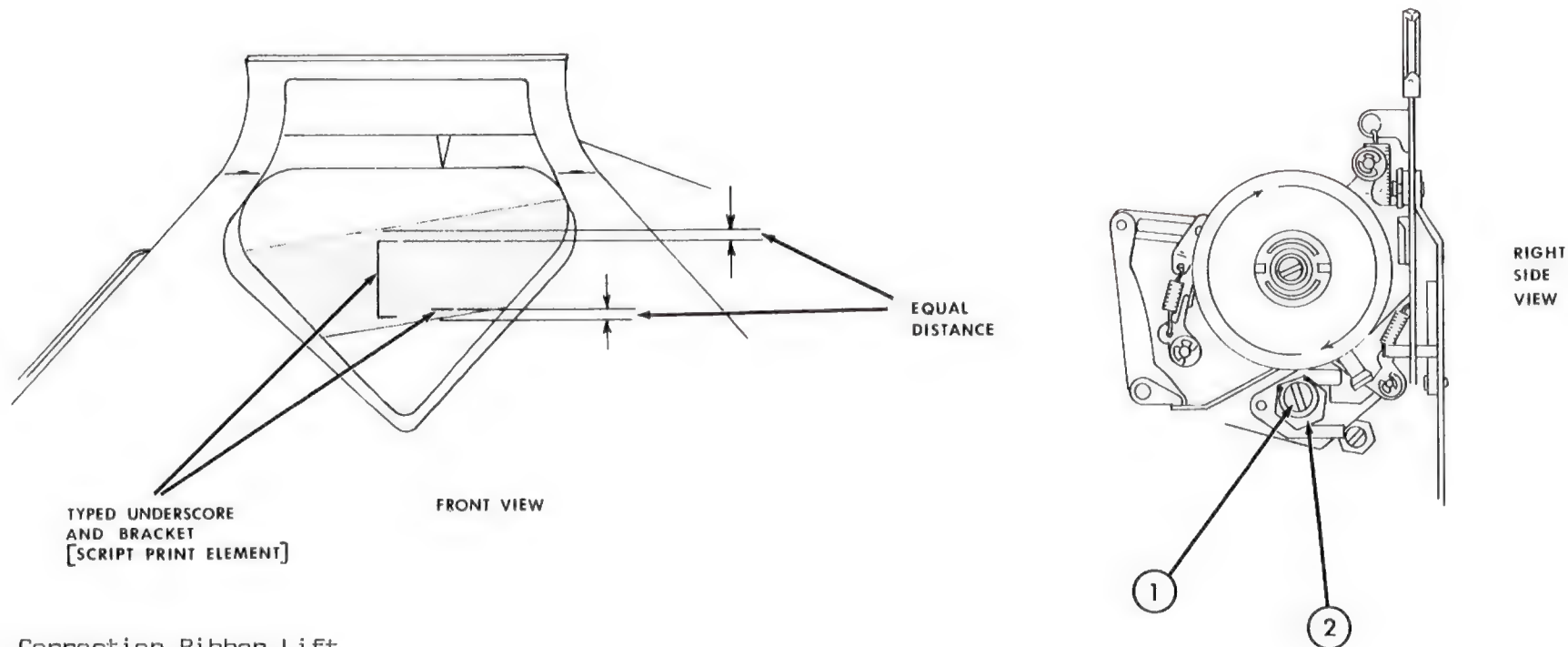
REQUIREMENT:

When TAKE-UP SPOOL (1) has one to ten full winds of Ribbon, ten to eleven correction cycles should rotate SPOOL (1) one half revolution.

TO CHECK: Install a fresh Correction Ribbon, and mark outer Flange of Take-up Spool for a reference point. Cycle the Correction mechanism ten to eleven times under power to check requirement.

ADJUSTMENT:

Form SENSOR ARM (2-A) up for less feed, down for more feed.



5. Correction Ribbon Lift

REQUIREMENT:

The distance between the top of a square bracket and the top of the Correction Ribbon should equal the distance between the bottom of an underscore and the bottom of the Correction Ribbon.

NOTE: These two characters are the tallest and the lowest characters on a Script Print Element.

TO CHECK: Insert a Script Print Element. Under power, type a square bracket and an underscore. Cycle the correction mechanism to correct the two characters and check requirement.

ADJUSTMENT:

Loosen SCREW (1) and regulate ECCENTRIC (2) to raise or lower Correction mechanism.

NOTE: When Correction mechanism height is correct, the Correction Ribbon at rest position should be .010"-.030" below an empty Petal.

SECTION 10
ELECTRICAL /ELECTRONIC

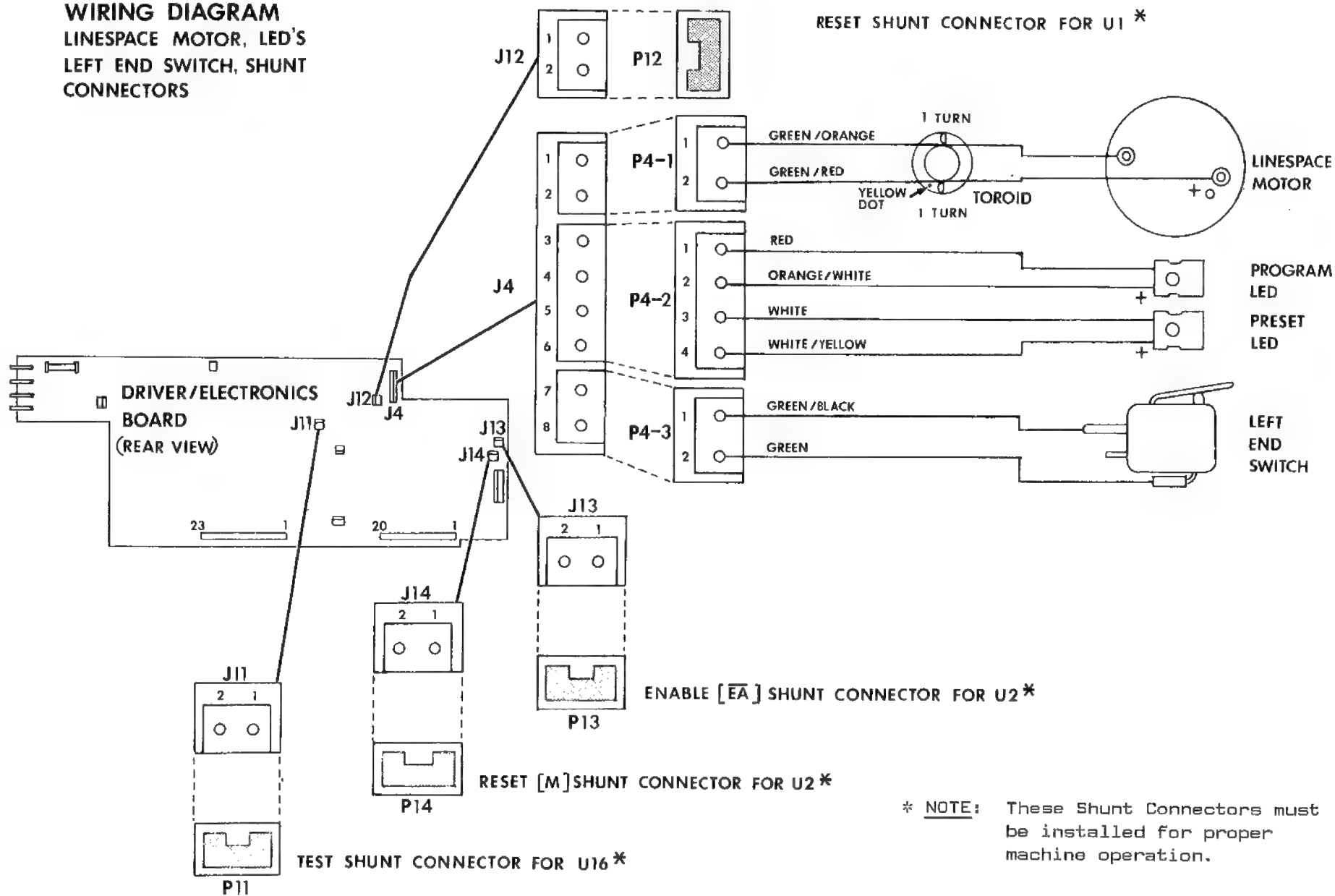
CONTENTS

- 10A. WIRING DIAGRAMS
- 10B. RESISTANCE CHECKS
- 10C. COMPONENT LAYOUTS
- 10D. SCHEMATICS
- 10E. WIRE ROUTING

WIRING DIAGRAMS

POWER (117V/60Hz)	10A-2
LINESPACE MOTOR, LED'S, LEFT END SWITCH, SHUNT CONNECTORS	10A-3
ELECTRONIC KEYBOARD, PITCH SWITCHES, KEYBOARD SWITCH	10A-4
LANGUAGE SELECTION, RO CABLE, STALL ANALYSIS, SERVICE PROGRAM	10A-5
CARRIER CABLE CONNECTORS, J1, J201, J202, J203, & J204	10A-7

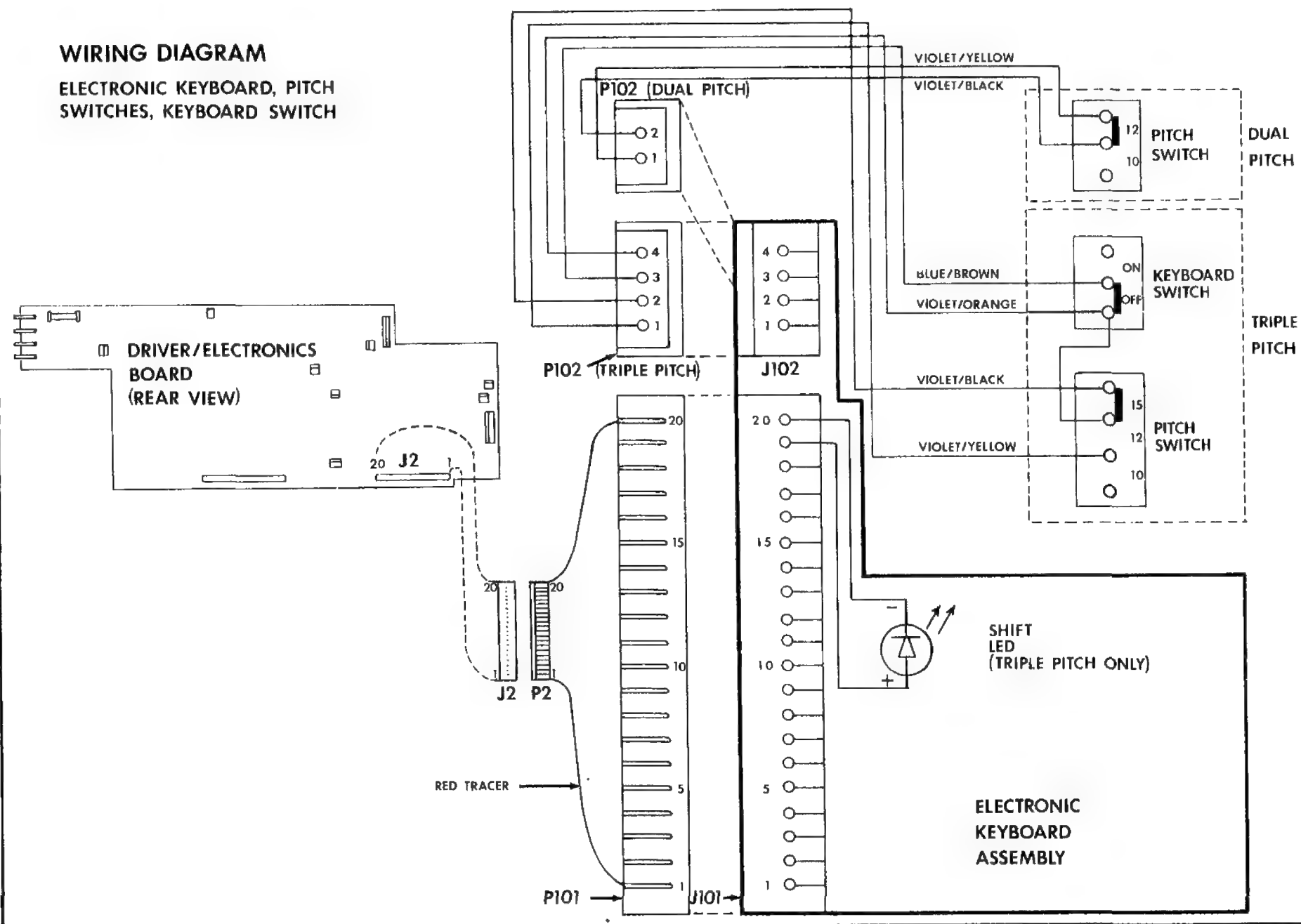
WIRING DIAGRAM **LINESPACE MOTOR, LED'S** **LEFT END SWITCH, SHUNT** **CONNECTORS**



* **NOTE:** These Shunt Connectors must be installed for proper machine operation.

WIRING DIAGRAM

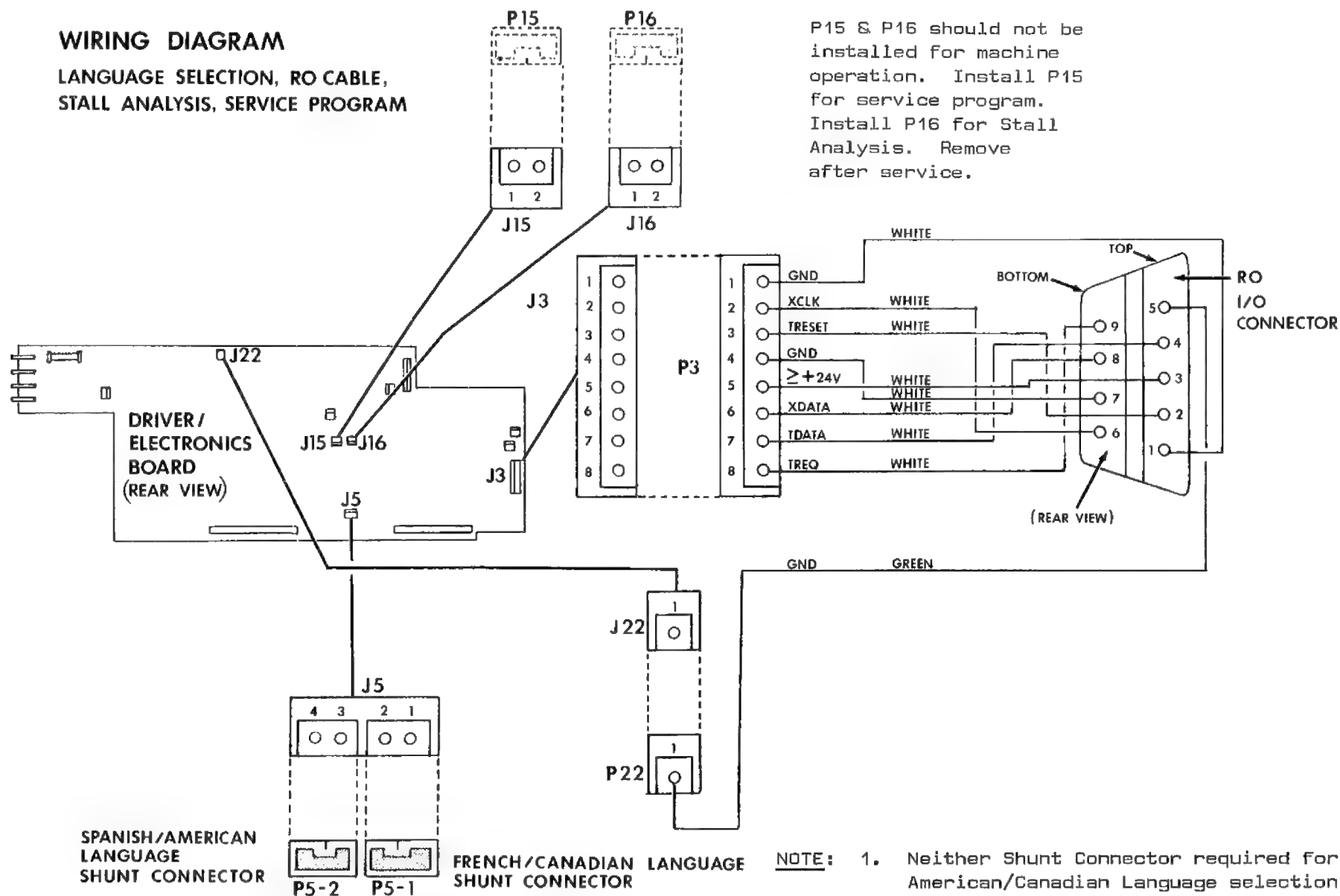
ELECTRONIC KEYBOARD, PITCH
SWITCHES, KEYBOARD SWITCH



WIRING DIAGRAM

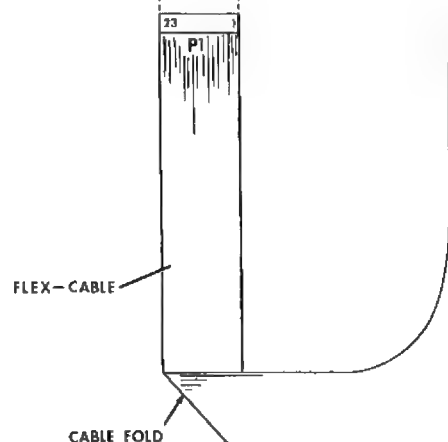
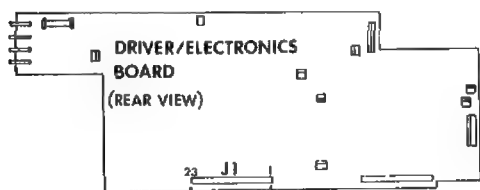
LANGUAGE SELECTION, RO CABLE,
STALL ANALYSIS, SERVICE PROGRAM

P15 & P16 should not be
installed for machine
operation. Install P15
for service program.
Install P16 for Stall
Analysis. Remove
after service.

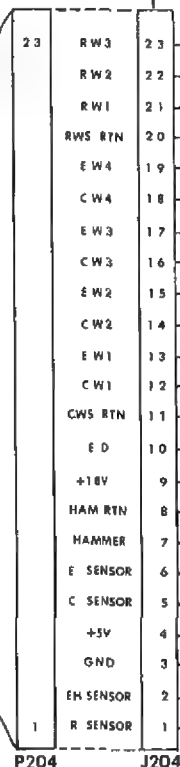
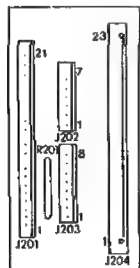


WIRING DIAGRAM

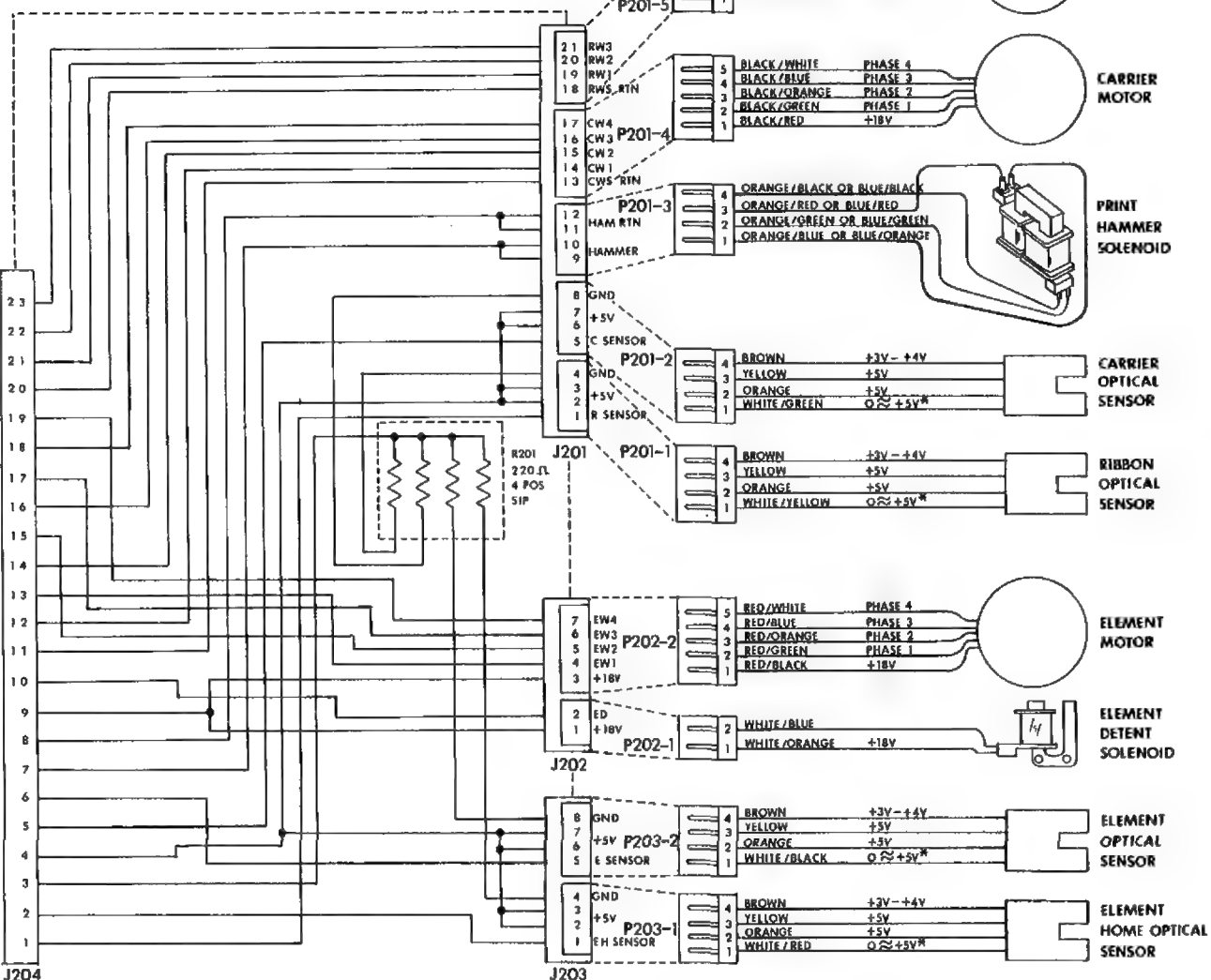
CARRIER CABLE CONNECTORS J1, J201, J202, J203, AND J204



CARRIER P. C. BOARD



CARRIER P. C. BOARD



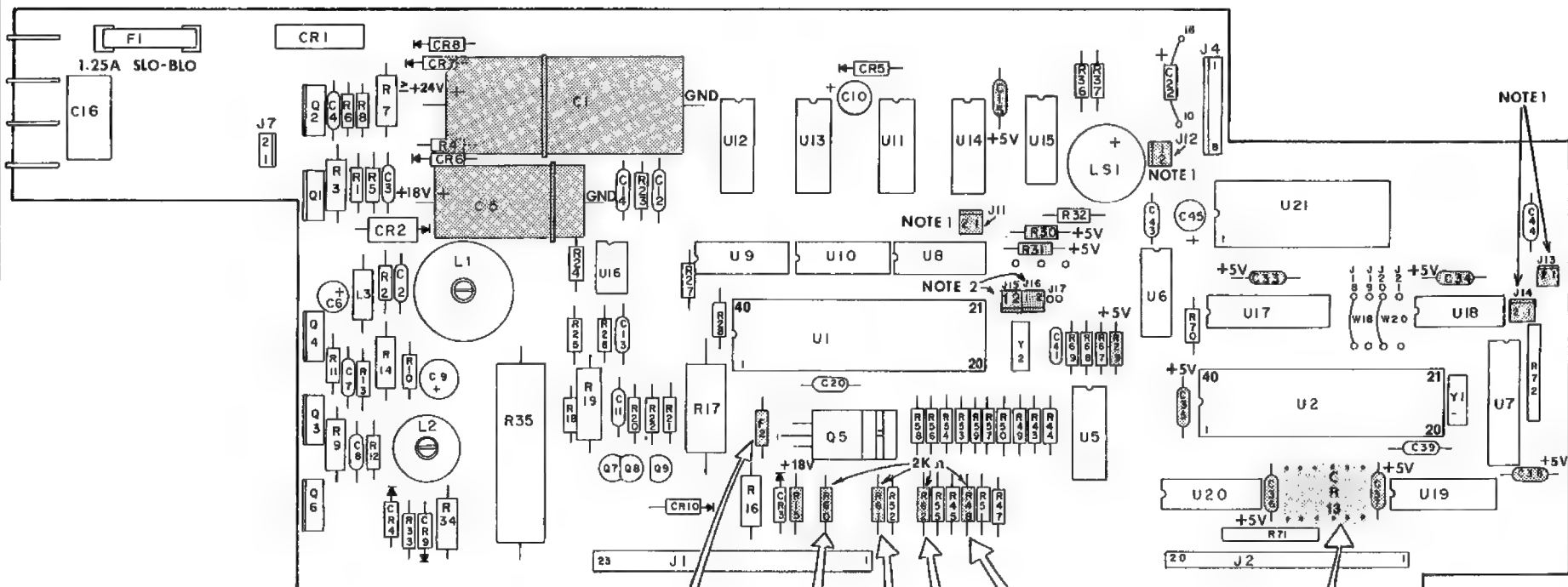
RESISTANCE CHECKS

Use the following Resistance Check Chart when troubleshooting problems with electrical components. With Ohmmeter probes on the specified pins of the connector, the resistance should read within the approximate range given in the chart (some variation may occur). The Wiring Diagram for each component is listed in the Reference Page column.

<u>REFERENCE PAGE</u>	<u>COMPONENT</u>	<u>CONNECTOR</u>	<u>PIN NUMBERS</u>	<u>RESISTANCE</u>
10A-3	Linespace Motor	P4-1	1 & 2	23-70 Ω
10A-6	Element Detent Solenoid	P202-1	1 & 2	30.4-33.6 Ω
10A-6	Element Motor (Phase 1)	P202-2	1 & 2	13.0-14.4 Ω
10A-6	Element Motor (Phase 2)	P202-2	1 & 3	13.0-14.4 Ω
10A-6	Element Motor (Phase 3)	P202-2	1 & 4	13.0-14.4 Ω
10A-6	Element Motor (Phase 4)	P202-2	1 & 5	13.0-14.4 Ω
10A-6	Carrier Motor (Phase 1)	P201-4	1 & 2	11.4-12.6 Ω
10A-6	Carrier Motor (Phase 2)	P201-4	1 & 3	11.4-12.6 Ω
10A-6	Carrier Motor (Phase 3)	P201-4	1 & 4	11.4-12.6 Ω
10A-6	Carrier Motor (Phase 4)	P201-4	1 & 5	11.4-12.6 Ω
10A-6	Hammer Solenoid	P201-3	1 & 3	1.7-2.1 Ω
10A-6	Hammer Solenoid	P201-3	2 & 4	1.7-2.1 Ω
10A-6	Ribbon Motor (Phase 1)	P201-5	1 & 2	19.6-21.7 Ω
10A-6	Ribbon Motor (Phase 2)	P201-5	1 & 3	19.6-21.7 Ω
10A-6	Ribbon Motor (Phase 3)	P201-5	1 & 4	19.6-21.7 Ω

COMPONENT LAYOUT

DRIVER/ELECTRONICS BOARD
DUAL PITCH TYPEWRITERS



NOTE 1: J11, J12, J13, & J14 Shunt Connectors must be installed for proper machine operation.

NOTE 2: J15 & J16 do not require Shunt Connectors for proper machine operation.

REPLACEABLE
HAMMER PICO
FUSE [5 AMPERE]

CARRIER
OPTICAL
SENSOR

ELEMENT
OPTICAL
SENSOR

ELEMENT
HOME
OPTICAL
SENSOR

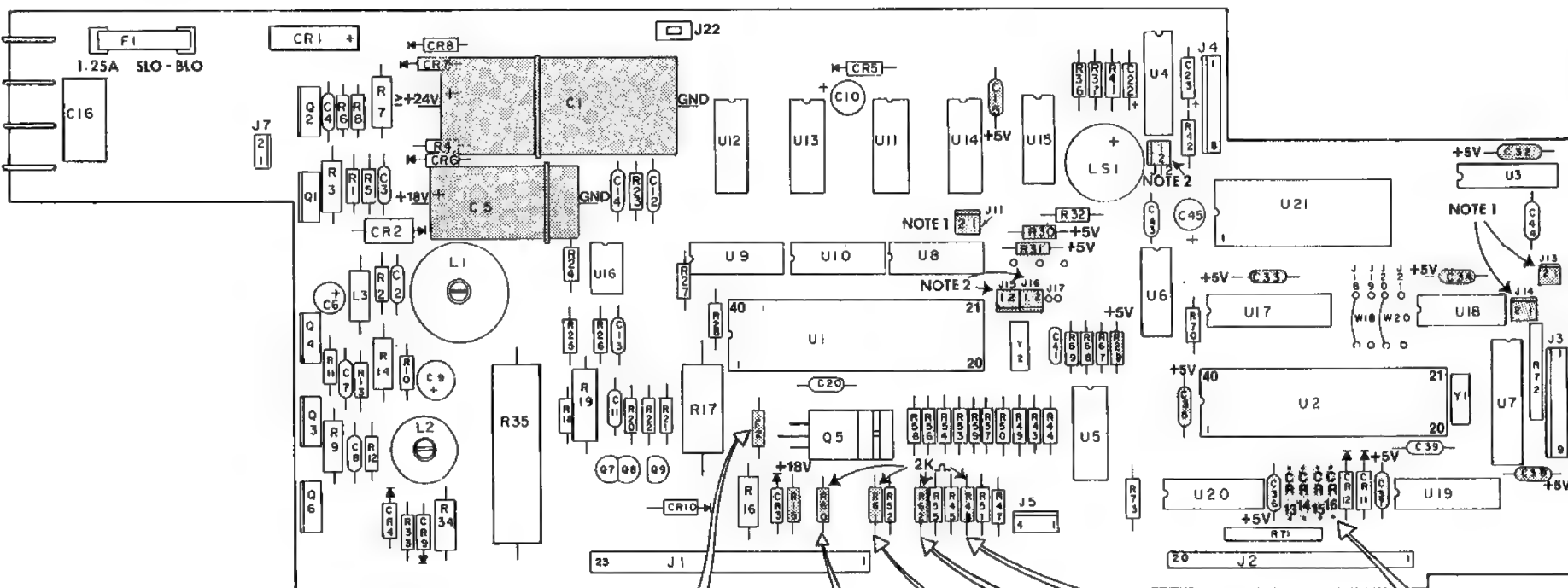
RIBBON
OPTICAL
SENSOR

SEE FEATURE
SELECTION
DIODE CHART
ON SCHEMATIC
DIAGRAM

COMPONENT LAYOUT

DRIVER/ELECTRONICS BOARD

TRIPLE PITCH TYPEWRITERS



NOTE 1: J11, J12, J13, & J14 Shunt Connectors must be installed for proper machine operation.

NOTE 2: J15 & J16 do not require Shunt Connectors for proper machine operation.

REPLACEABLE
HAMMER PICO
FUSE (AMPERE)

CARRIER
OPTICAL
SENSOR

ELEMENT
OPTICAL
SENSOR

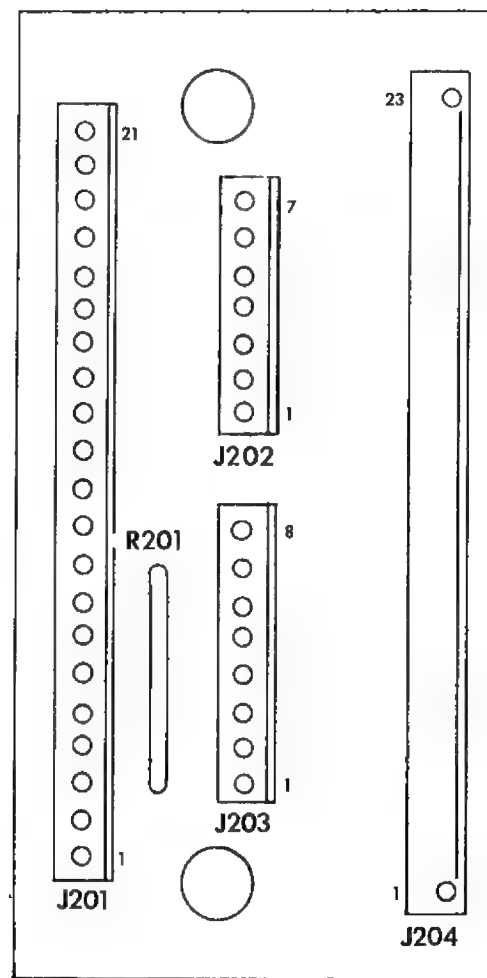
ELEMENT
HOME
OPTICAL
SENSOR

RIBBON
OPTICAL
SENSOR

SEE FEATURE
SELECTION
DIODE CHART
ON SCHEMATIC
DIAGRAM

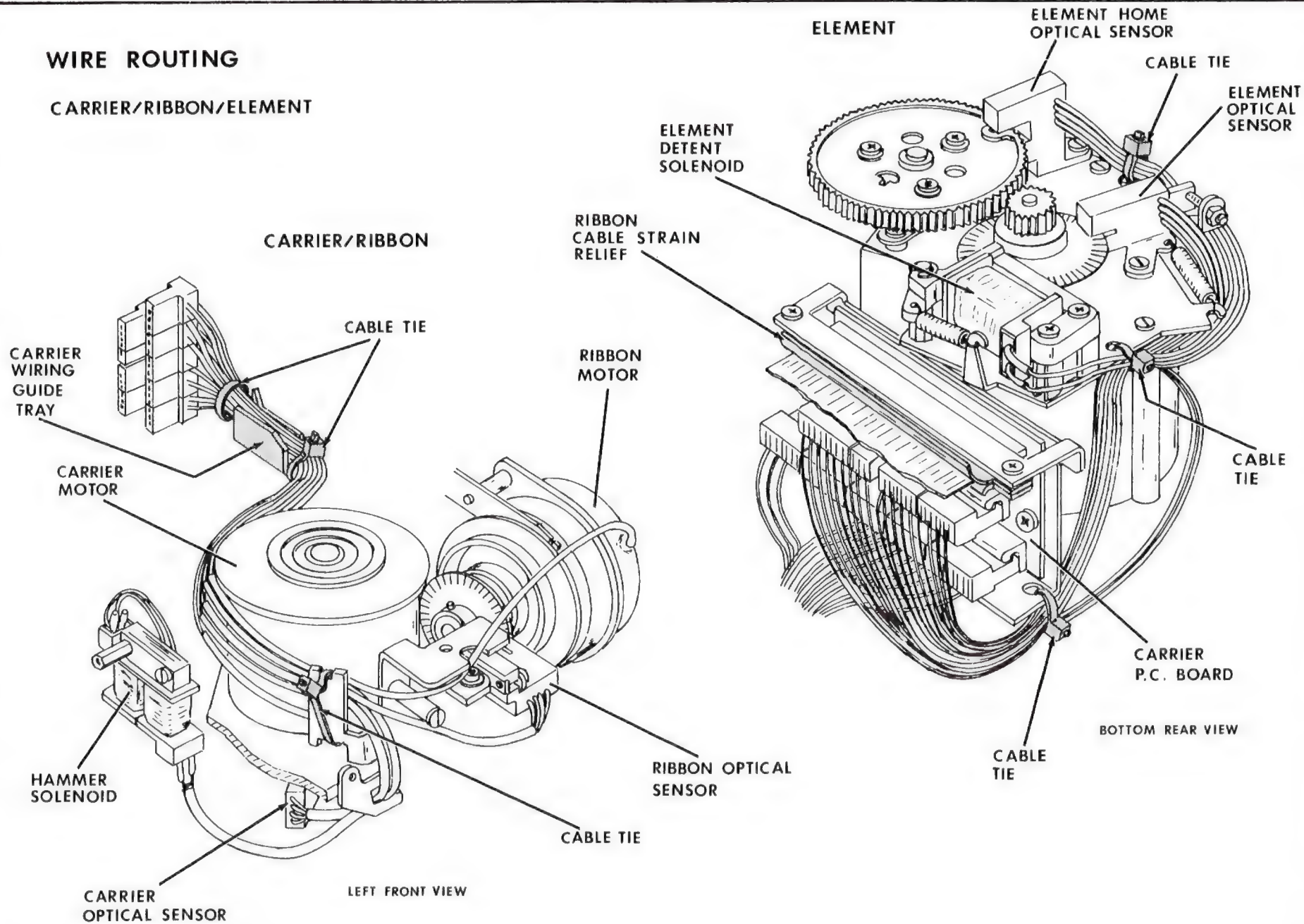
COMPONENT LAYOUT

CARRIER P. C. BOARD



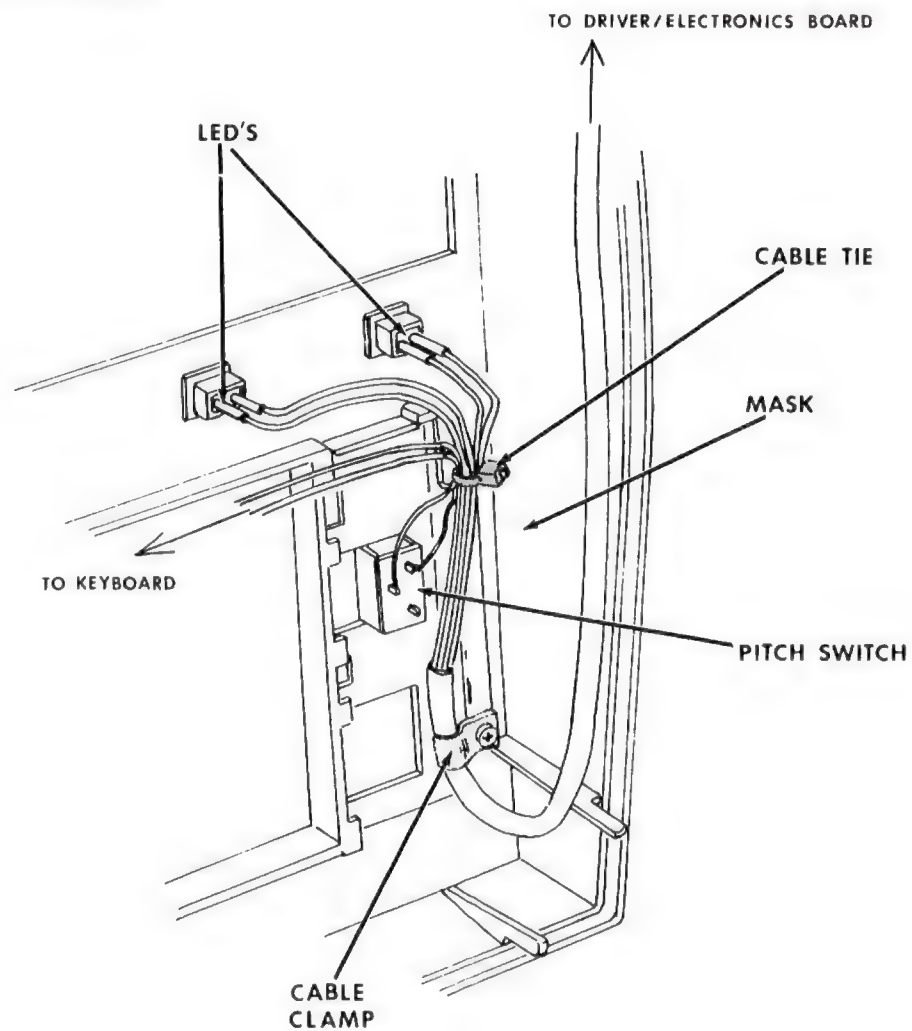
WIRE ROUTING

CARRIER/RIBBON/ELEMENT

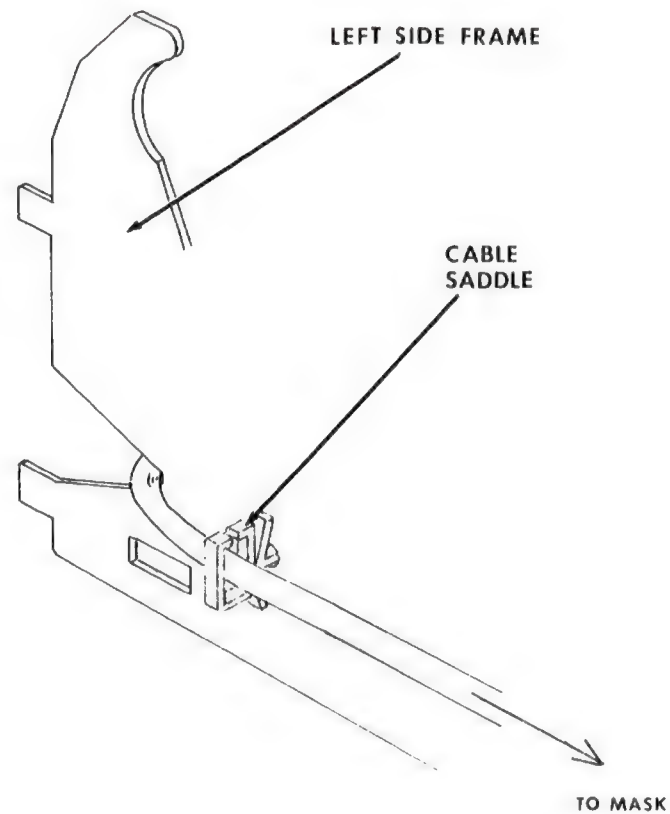


WIRE ROUTING

MASK/FRAME



BOTTOM VIEW



LEFT SIDE VIEW

LUBRICATION

The main lubrication points for Electronic Multipitch Portable Typewriters are listed on the following pages, and are organized according to Sections in the Service Manual. The following lubricants are required.

42XL Oil
Shell Alvania EP1 Grease #71031
A00 Oil
DTE Oil
Gredag #52
Nyogel 743B
Dow #200 Silicone

To aid identification of parts, a "Reference Page" number appears after each part name. This number refers to a page in the Service Manual on which the subject part is illustrated. An asterisk (*) appears next to "Reference Pages" when the subject parts are illustrated but not referred to in the text. Identification of these parts may require reference to a current Parts Manual.

IMPORTANT: The following parts require no lubrication, and should be free of dirt, grease, and oil:

<u>PART NAME</u>	<u>REFERENCE PAGE #</u>
Carrier Drive Gear Encoder	4-3
Carrier Optical Sensor	4-4
Element Drive Gear Encoder	5-4
Element Optical Sensor	5-5
Element Home Optical Sensor	5-6
Ribbon Cam Encoder	8-2
Ribbon Optical Sensor	8-2
Driver/Electronics Board	10A-2

	<u>LUBRICANT</u>	<u>REF.</u> <u>PAGE</u>		<u>LUBRICANT</u>	<u>REF.</u> <u>PAGE</u>
<u>PAPER FEED</u>					
Left & Right Platen Bushings	A00	2-3	Mounting Bracket Eccentric	A00	4-5
Left & Right Platen Latches	A00	2-3*	Mounting Bracket Shoulder Screw	A00	4-5*
Front & Rear Feed Rollers			Capstan Gear Screw (under head)	A00	4-5*
(Bearing surfaces)	Gredag	2-4	Front Carrier Support Shaft (front surface)	Dow 200	4-3
Paper Release Shaft Arms (contact and Cam surfaces)	Gredag	2-2	Carrier Bearing Felt Washers	Dow 200	4-2*
Paper Release Shaft (pivots)	A00	2-2	<u>PRINT ELEMENT</u>		
Paper Bail Shaft (pivots & E-Ring grooves)	A00	2-2	Element Gear Detent (pivot)	A00	5-3
Paper Release Lever (Roller)	A00	2-2	Element Hub Retainer Plate (Bearing for Element Drive Disc Shaft)	Nyogel	5-7*
Paper Bail Cam Arm Roller (Stud)	A00	2-2	<u>PRINT HAMMER</u>		
Left & Right Paper Bail Arm (pivots)	A00	2-2	Hammer Pivot Shaft Assembly (pivots)	A00	6-3
Paper Bail Arm(s) (Cam surfaces)	Alvania	2-2	Hammer Pivot Shaft Assembly (Stop surface)	Alvania	6-5
<u>LINESPACE</u>			Hammer Assembly (pivot holes)	A00	6-4
Linespace Selector (pivot)	A00	3-5	Hammer Retractor Knob (pivot Screw)	A00	6-2
Linespace Selector Detent (pivot)	A00	3-5	Hammer Retractor Linkage (pivots)	A00	6-2
Linespace Wheel Detent (Roller surface & Roller Stud)	DTE	3-4	Hammer Actuator (pivot)	A00	6-6
Linespace Wheel Detent Bracket (pivots)	A00	3-4*	Hammer Actuator (Down-Stop surface)	Alvania	6-6
Anti-Backup Pawl (pivots)	A00	3-6	Hammer Actuator (at contact with Hammer Assembly Arm)	Alvania	6-6
Linespace Cam Threaded Drive Stud (Bearing Surfaces)	A00	3-7*	Hammer Assembly Arm (at contact with Hammer Actuator)	Alvania	6-6
Linespace Cam (Cam surface)	Alvania	3-3	Hammer Restore Spring (extend spring and apply liberal coating along entire length)	Alvania	6-4
Linespace Pawl (pivot)	A00	3-4	Impression Control Plate (Bearings)	A00	6-7
Cam Follower-Drive Arm (pivots)	A00	3-4	Impression Control Spring (extend spring and apply liberal coating along entire length)	Alvania	6-7
Linespace Slip Clutch (Felts)	42XL	3-7	Rocker Mounting Plate (Impression Control Lever Detent notches)	A00	6-7*
Linespace Pawl Stop (front edge)	Alvania	3-4			
<u>CARRIER DRIVE</u>					
Capstan Gear Mounting Bracket (Eccentric & Shoulder Screw Holes, Capstan Gear Pivot Stud, Carrier Casting contact surface)	A00	4-5			

	<u>LUBRICANT</u>	<u>REF. PAGE</u>
<u>CARTRIDGE RIBBON</u>		
Cartridge Rocker (all pivot studs and pivot holes)	A00	8-2*
Cartridge Rocker (Cam Follower Roller & Stud)	DTE	8-2
Ribbon Metering Pawls (pivot holes)	A00	8-2
Ribbon Feed Links (pivot holes)	A00	8-2*
Metering Pinion Bracket (pawl pivot studs, Metering Pinion bearing, pinion shaft shoulder)	A00	8-2
Ribbon Feed Arm (Stud, shoulder screw, and all working surfaces)	A00	8-2
Ribbon Feed Cam Setting Plate (feed lever fork)	A00	8-2
Ribbon Feed Lever (Studs & Rollers)	DTE	8-2
Ribbon Feed Lever (working surfaces)	A00	8-2
Ribbon Feed Lever Pivot Stud (entire stud)	A00	8-2*

CORRECTION RIBBON

Correction Link (Stud, pivot hole, and slot)	A00	9-2*
Bellcrank (Stud, pivot hole, and slot)	A00	9-2*
Take-Up Spool Sensor (Stud and pivot stud)	A00	9-2
Correction Ribbon Pawl Carrier (Studs and hub)	A00	9-2*
Correction Lift Bracket (Studs, Guide Ear, and Guide Slot)	A00	9-2
Correction Ribbon Lift Arm/Lift Bracket Pivot Nut (outer pivot surface)	A00	9-2*
Correction Ribbon Lift Arm Assembly (Cam Roller and Stud)	DTE	9-2*
Correction Ribbon Lift Arm Assembly (pivot holes and studs)	A00	9-2*

LUBRICANT REF.
PAGE

REMOVALS

GENERAL PROCEDURE:

All removals should be performed with power cord unplugged and machine at rest.

Prior removal of particular groups of parts is indicated in each removal procedure as required.

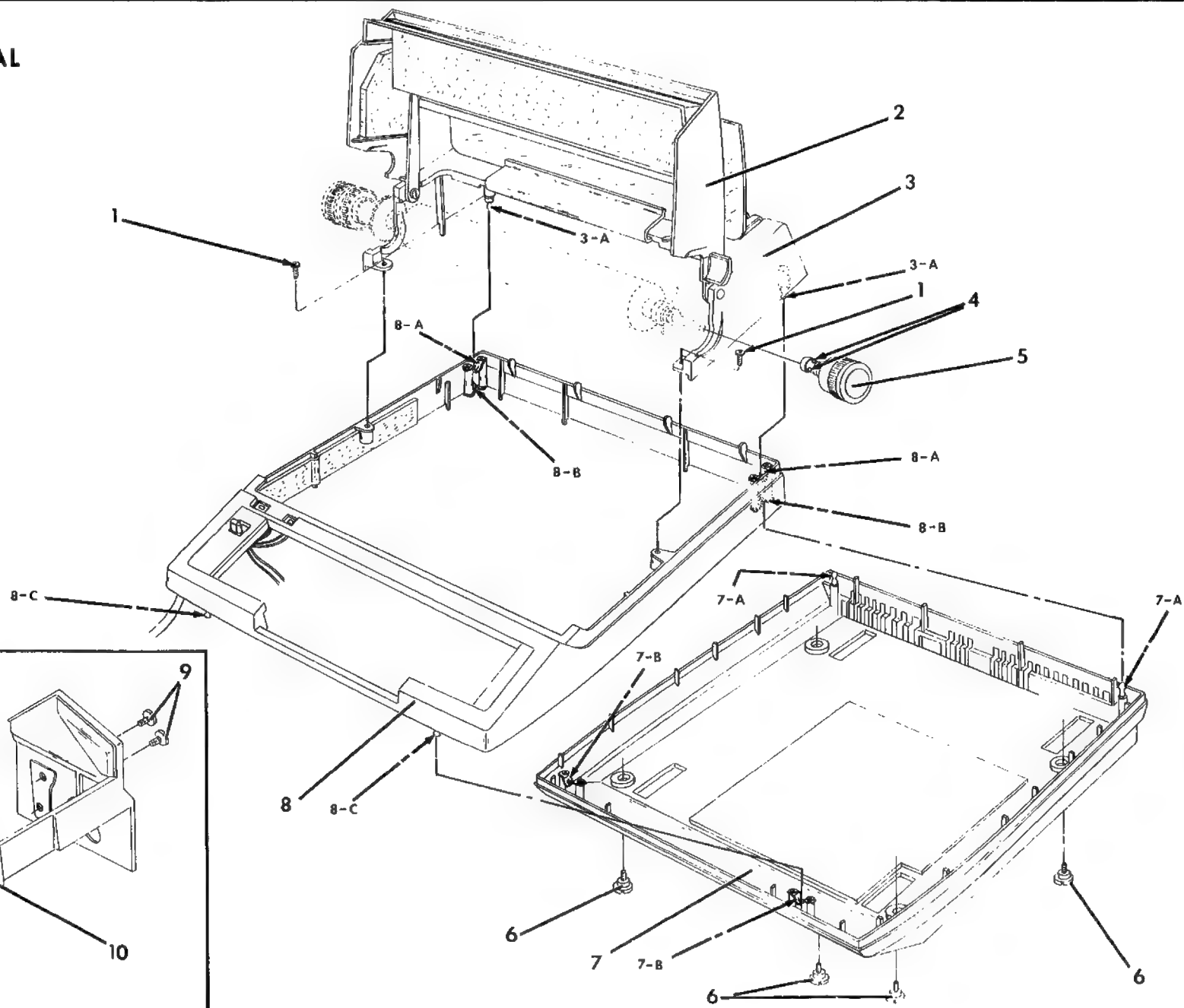
Adjustments broken during a removal are indicated at the bottom of each procedure, and are referenced to adjustment numbers in the Service Manual. Refer to the Branch Displays at the beginning of each section of the Service Manual for sequential relationships among adjustments.

REMOVALS INDEX

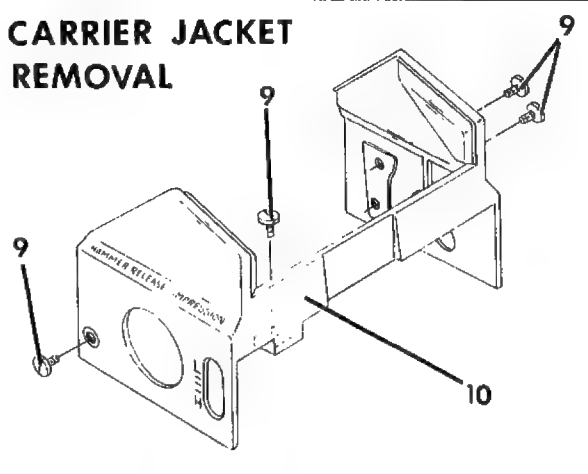
Jacket Removal -----12-2
Carrier Jacket Removal -----12-2
Platen & Paper Table Removal -----12-4
Keyboard Module Removal -----12-6
Carrier Module Removal -----12-6
Capstan Gear & Cable Removal -----12-7
Element Motor Removal -----12-8

Cartridge Rocker Removal -----12-10
Correction Ribbon Mechanism Removal-12-10
Ribbon Motor Removal -----12-11
Driver/Electronics Board Removal ---12-12
Key Switch Removal -----12-12
Solenoids & Optical Sensors Removal-12-13
Carrier Motor Rotor Removal -----12-14

JACKET REMOVAL



CARRIER JACKET REMOVAL



JACKET REMOVAL

CASING BASE

1. Remove four SCREWS (6).
2. Snap FASTENERS (8-C) out of Front CLIPS (7-B) in Casing Base. Snap CASING BASE FASTENERS (7-A) out of Lower MASK CLIPS (8-B), and lift off CASING BASE (7).

REPLACEMENT: Reverse procedure.

ADJUSTMENTS BROKEN: None.

CASING TOP & MASK

1. Remove Casing Base.
2. Raise Front CASING TOP (2).
3. Remove two SCREWS (1).
4. Snap FASTENERS (3-A) out of Upper MASK CLIPS (8-A), and remove CASING TOP (3) from the rear.
5. Disconnect LED & Switch Connector from Driver/Electronics Board, and remove Wiring Assembly from Cable Saddle at rear of Left Frame. Disconnect Switch Connector from Keyboard PC Board.
6. Loosen SCREWS (4) and remove Right PLATEN KNOB (5).
7. Lift right side of MASK (8) and remove Mask with attached LED and Switch Wires to the left.

REPLACEMENT: Reverse procedure.

ADJUSTMENTS BROKEN: Right Platen Knob clearance (Paper Feed Adjustment #1, Requirement B-1, Adjustment Step #5).

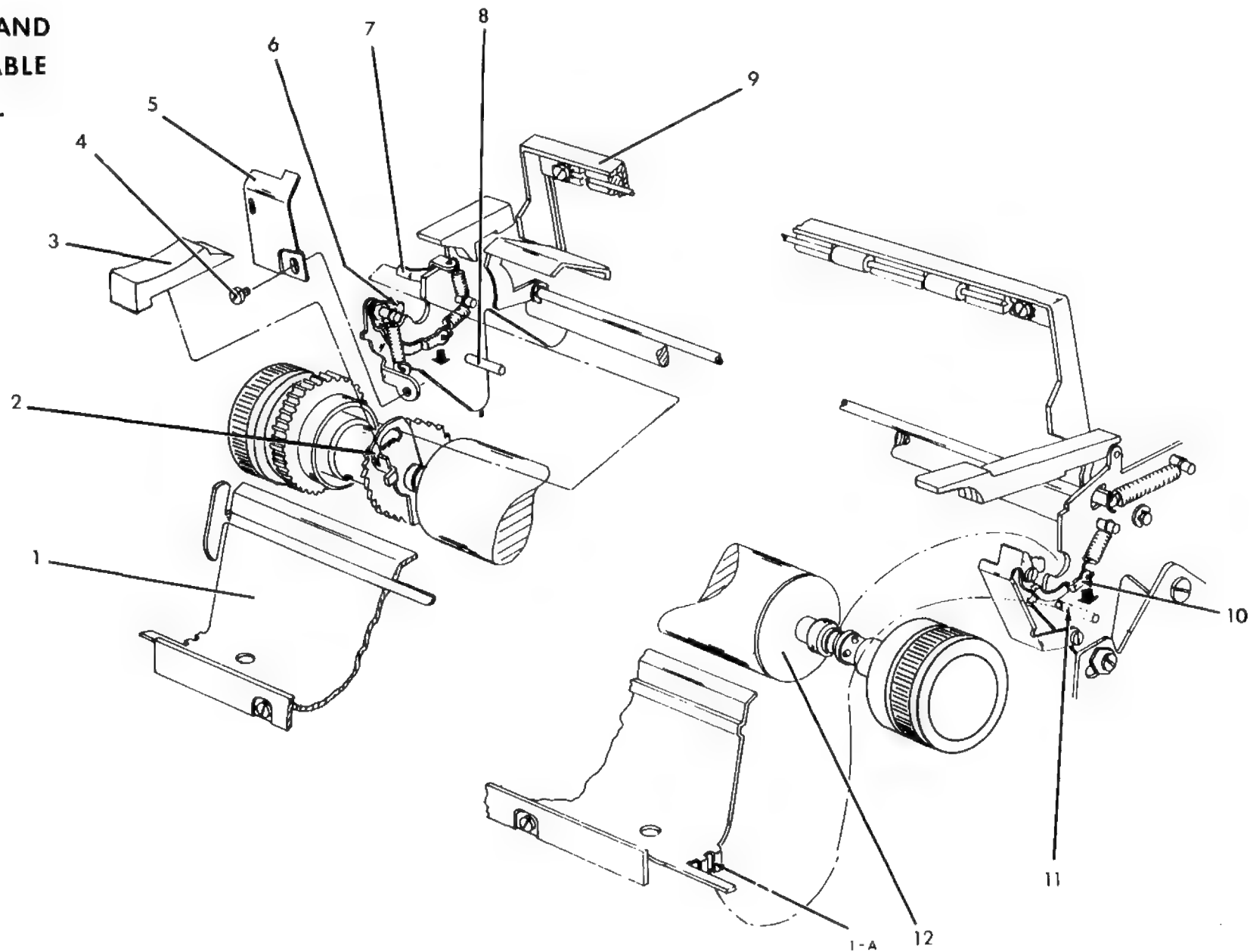
CARRIER JACKET

1. Remove four SCREWS (9).
2. Spread sides of CARRIER JACKET (10), and lift off.

REPLACEMENT: Reverse procedure.

ADJUSTMENTS BROKEN: None.

PLATEN AND PAPER TABLE REMOVAL



PLATEN AND PAPER TABLE REMOVAL

PLATEN

1. Raise Front Casing Top.
2. Remove LINESPACE SELECTOR BUTTON (3).
3. Remove SCREW (4) and LINESPACE INDICATOR FILLER (5).
4. Use Spring Hook to disengage LINESPACE SELECTOR DETENT (7) from LINESPACE SELECTOR (2).
5. Raise PAPER BAIL (9).
6. Use Spring Hook to push Left PLATEN LATCH (6) downward, and lift left side of PLATEN (12) to disengage Latch.
7. Raise Paper Release Lever. Use Spring Hook to push Right PLATEN LATCH (10) downward, disengage right side of PLATEN (12) from Latch, and lift out Platen.

REPLACEMENT: Reverse procedure.

ADJUSTMENTS BROKEN: None.

PAPER TABLE

1. Remove Platen.
2. Lift PAPER TABLE (1) off STUDS (8) & (11); rotate Paper Table top rearward and pull forward to remove.

REPLACEMENT: Reverse procedure. NOTE: Paper Table FORK (1-A) seats on notch in STUD (11).

ADJUSTMENTS BROKEN: None.

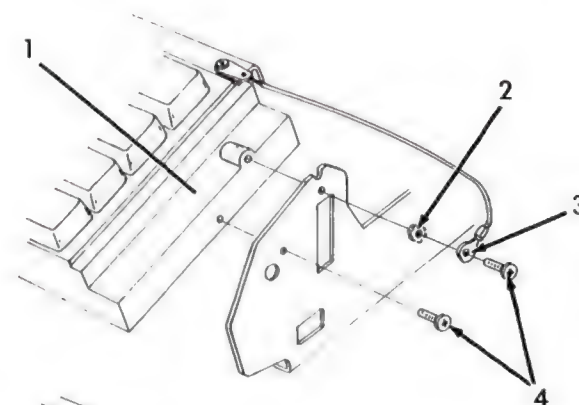
KEYBOARD MODULE REMOVAL

1. Remove machine Jackets (see Jacket Removal).
2. Disconnect Connectors from bottom of Keyboard Printed Circuit Board.
3. Remove four SCREWS (4)--two on each side--and lift out KEYBOARD MODULE (1).

REPLACEMENT: Reverse procedure. NOTE: LOCK WASHER (2) should be reassembled between GROUND TERMINAL (3) and Right Side Frame.

ADJUSTMENTS BROKEN: None.

RIGHT SIDE VIEW

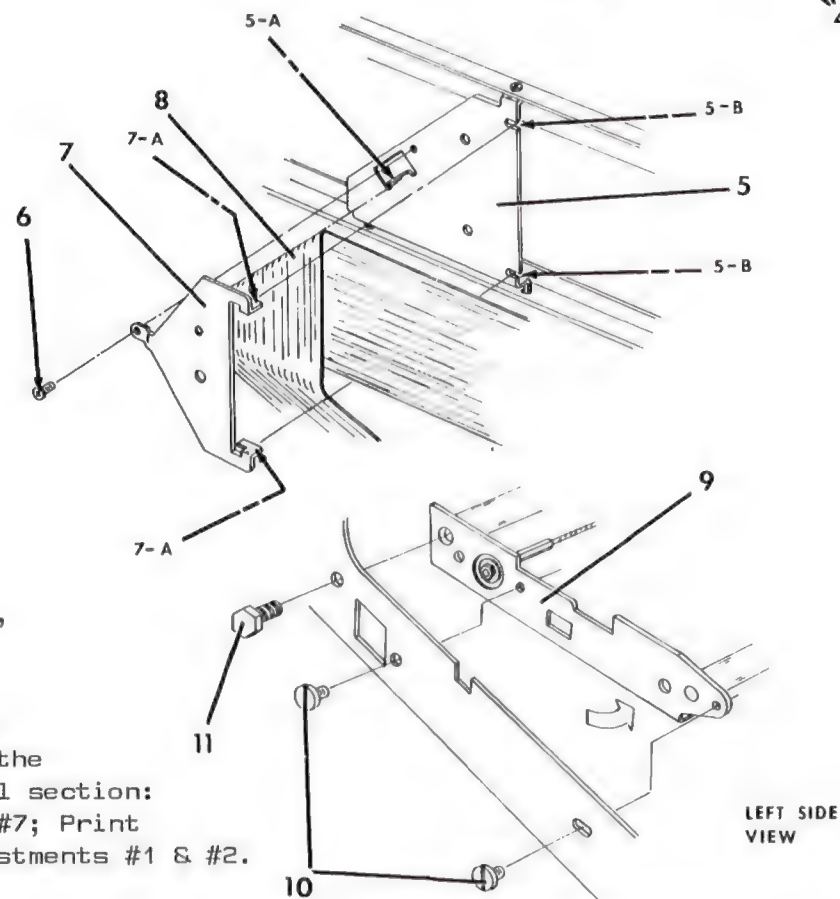
CARRIER MODULE REMOVAL

1. Remove machine Jackets and Keyboard Module.
2. Move Carrier to extreme right. Remove SCREW (6) and CABLE CLAMP (7).
3. Disconnect CARRIER RIBBON CABLE (8) from Driver/Electronics Board.
4. Remove two SCREWS (11)--one on each side.
5. Remove three SCREWS (10)--two on left side and one on right side.
6. Slide CARRIER MODULE (9) forward. Lift front of Module and remove from Frames. CAUTION: Take care not to damage Ribbon Guide when removing and replacing Carrier Module.

REPLACEMENT: Reverse procedure. NOTE: When re-installing RIBBON CABLE (8) and CABLE CLAMP (7), make sure folded edge of Cable rests against FORM (5-A). Also, make sure Cable rests between EARS (7-A), and that EARS (7-A) fit in SLOTS (5-B).

ADJUSTMENTS BROKEN: None.

NOTE: When installing a new Carrier Module, check the following and all related adjustments as indicated by the Branch Displays at the beginning of each Service Manual section: Carrier Drive Adjustment #6; Print Element Adjustment #7; Print Hammer Adjustments #4, 5, and 8; and Ribbon Guide Adjustments #1 & #2.



LEFT SIDE VIEW

CAPSTAN GEAR AND CABLE REMOVAL

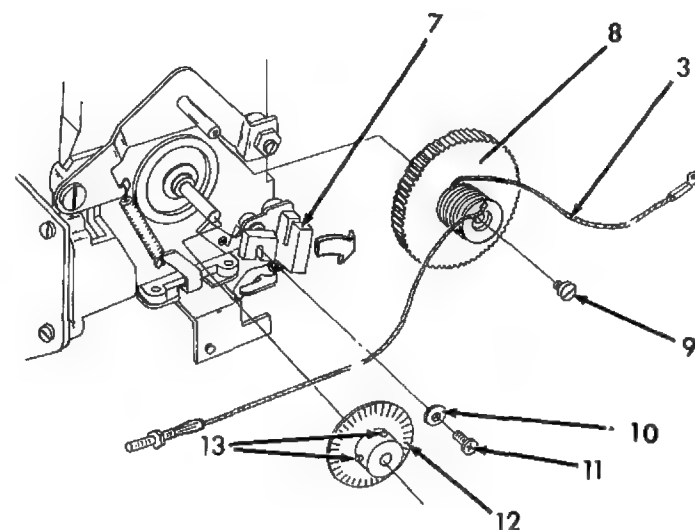
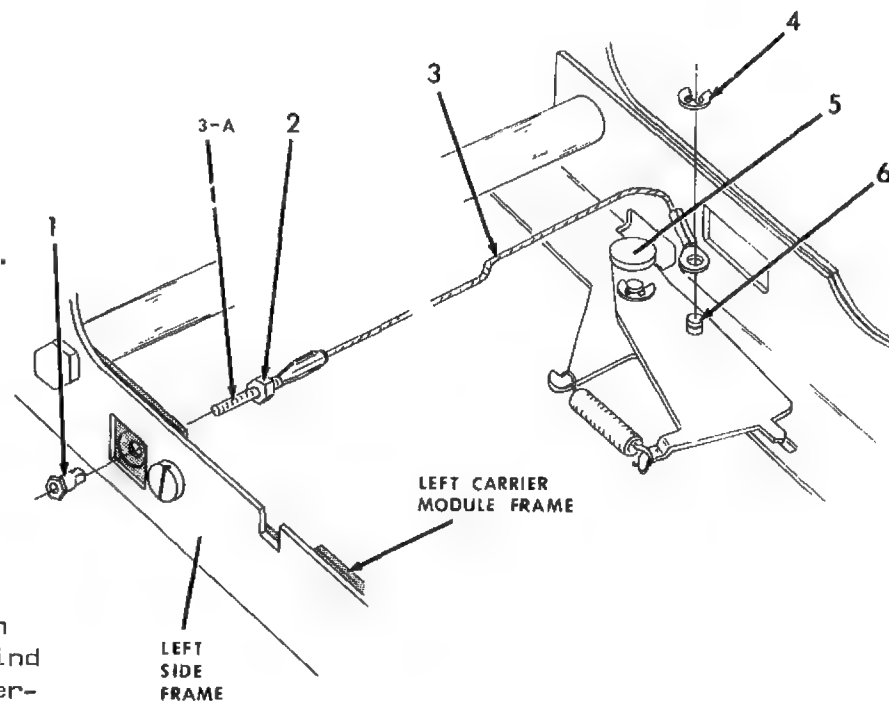
1. Remove machine Jackets (see Jacket Removal).
NOTE: Capstan Gear and Cable can be removed without removing Carrier Module from machine frames.
2. Loosen LOCK NUT (2), and remove ANCHOR NUT (1) from CABLE ANCHOR SCREW (3-A).
3. Remove E-RING (4), and remove right end of CABLE (3).
4. Remove SCREW (11) and WASHER (10). Swing OPTICAL SENSOR (7) away from CARRIER DRIVE GEAR ENCODER (12). **CAUTION:** Take care not to damage Encoder.
5. Loosen two SCREWS (13) and remove ENCODER (12).
6. Remove SCREW (9) and CAPSTAN GEAR (8) with attached CABLE (3).

REPLACEMENT: (Refer to Carrier Drive Adjustment #5)

- A) Make a mark on the Cable 13.7"±.200" from the Threaded Terminal End. Slide Cable through Capstan Gear so the mark is located in the Gear Window. Wind end of Cable at Gear side of Capstan 4 turns counter-clockwise. Wind end of Cable at Gear Window side 4 turns clockwise. Make sure Cable nests in grooves of Capstan Gear. Use a piece of tape to hold the Cable in place.
- B) Move Carrier to the center of the Carrier Module and install CAPSTAN GEAR (8) with SCREW (9). Loop right end of Cable around STUD (5), place Cable Ring on STUD (6), and assemble E-RING (4). Assemble LOCK NUT (2) to ANCHOR SCREW (3-A). Place ANCHOR NUT (1) in hole in left Carrier Module Frame and assemble Anchor Screw to Anchor Nut. Hold in place with Lock Nut. Remove tape from Cable wound on Capstan Gear.
- C) Reassemble Encoder and Optical Sensor.

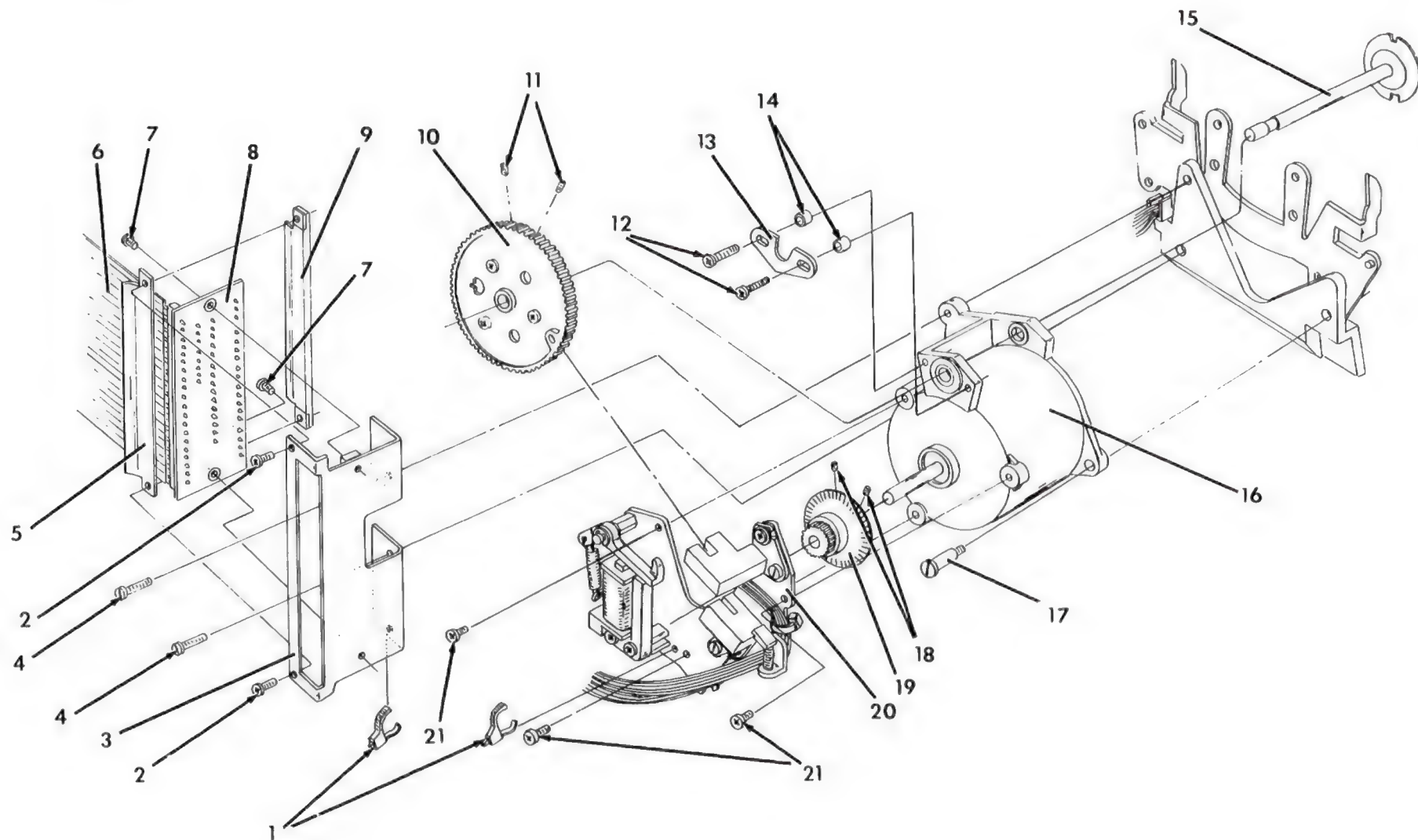
NOTE: Refer to Carrier Drive Adjustment #5 for specific information on exercising new Cables.

ADJUSTMENTS BROKEN: Carrier Drive Adjustments #2 (Carrier Encoder-Drive Gear Alignment); #3 (Carrier Optical Sensor Alignment); and #5 (Capstan Cable Tension).



BOTTOM VIEW

ELEMENT MOTOR REMOVAL



ELEMENT MOTOR REMOVAL

1. Remove Carrier Module (see Carrier Module Removal).
2. Disconnect all Motor, Solenoid, and Sensor Connectors from CARRIER PC BOARD (8). DO NOT REMOVE CARRIER CABLE (6).
3. Remove two SCREWS (2) and STRAIN RELIEF BRACKETS (5) & (9).
4. Remove two SCREWS (7) and CARRIER PC BOARD (8) with attached CARRIER RIBBON CABLE (6).
5. Cut two CABLE TIES (1).
6. Remove two SCREWS (4) and BRACKET (3). Remove SCREW (17), and remove Element Motor Assembly from Carrier Module.
7. Loosen two SET SCREWS (11). Remove ELEMENT DRIVE SHAFT (15), and lift out ELEMENT GEAR ASSEMBLY (10).
8. Remove three SCREWS (21). Move Rear CASTING PLATE ASSEMBLY (20) to the side so that it clears ELEMENT DRIVE GEAR ENCODER (19), and lift off. CAUTION: Take care not to damage Encoder.
9. Loosen two SET SCREWS (18), and remove ELEMENT DRIVE GEAR ENCODER (19).
10. Remove two SCREWS (12), two SPACERS (14), and ELEMENT HUB RETAINER PLATE (13) from ELEMENT MOTOR (16).

REPLACEMENT: Reverse procedure. NOTE: It may be necessary to leave SCREWS (12) loose, and disassemble Element Gear Plate from ELEMENT GEAR ASSEMBLY (10) to reassemble Element Drive Shaft. When reassembling Element Drive Shaft and Element Gear Assembly, follow the Coarse Adjustment procedure specified in Print Element Adjustment #5.

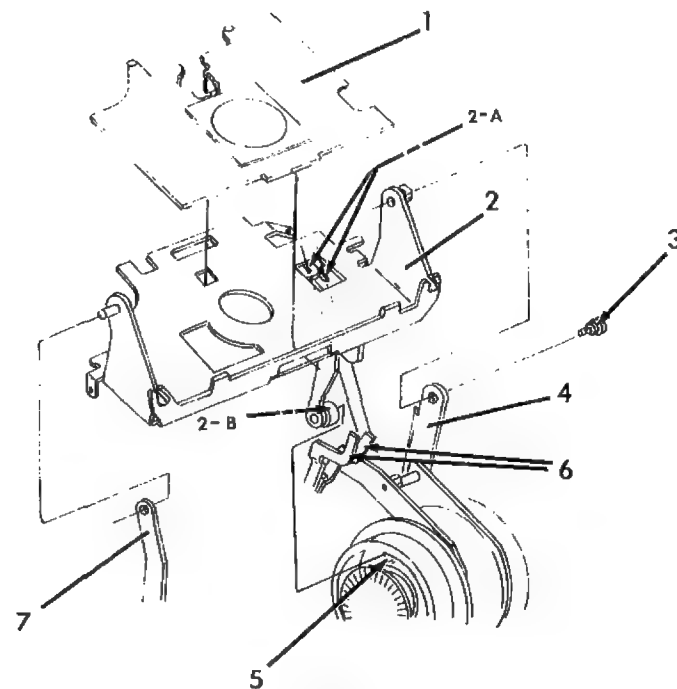
ADJUSTMENTS BROKEN: Print Element Adjustment #1 (Position of Element Detent Solenoid; #2 (Element Encoder-Drive Gear Alignment); #3 (Element Optical Sensor Alignment); and #5 (Element Drive Disc Position). NOTE: These adjustments also affect Print Element Adjustments #6 and #7 (see Branch Display at the beginning of the Element Drive Adjustment Section).

CARTRIDGE ROCKER REMOVAL

1. Remove Ribbon Cartridge; remove Casing Top, Mask, and Carrier Jacket (see Jacket Removal).
2. Manually rotate Ribbon Motor Rotor top forward to end of Ribbon Feed cycle.
3. Remove SCREW (3).
4. Spread ROCKER SUPPORTS (4) & (7) and lift CARTRIDGE ROCKER (2) top forward to remove.

REPLACEMENT: Place CAM FOLLOWER (2-B) in Inner Cam SURFACE (5) and reverse procedure. NOTE: When replacing Rocker, unsnap ROCKER INSERT (1) for viewing to make sure SLOTS (2-A) engage RIBBON FEED LEVERS (6).

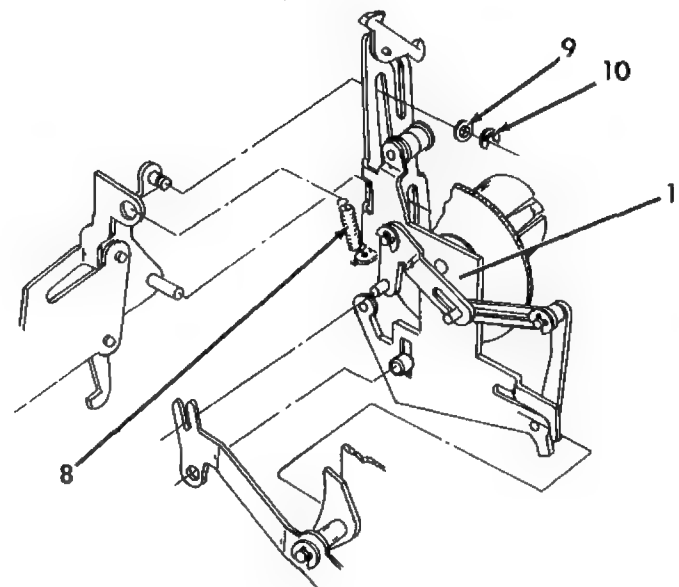
ADJUSTMENTS BROKEN: None.

CORRECTION RIBBON MECHANISM REMOVAL

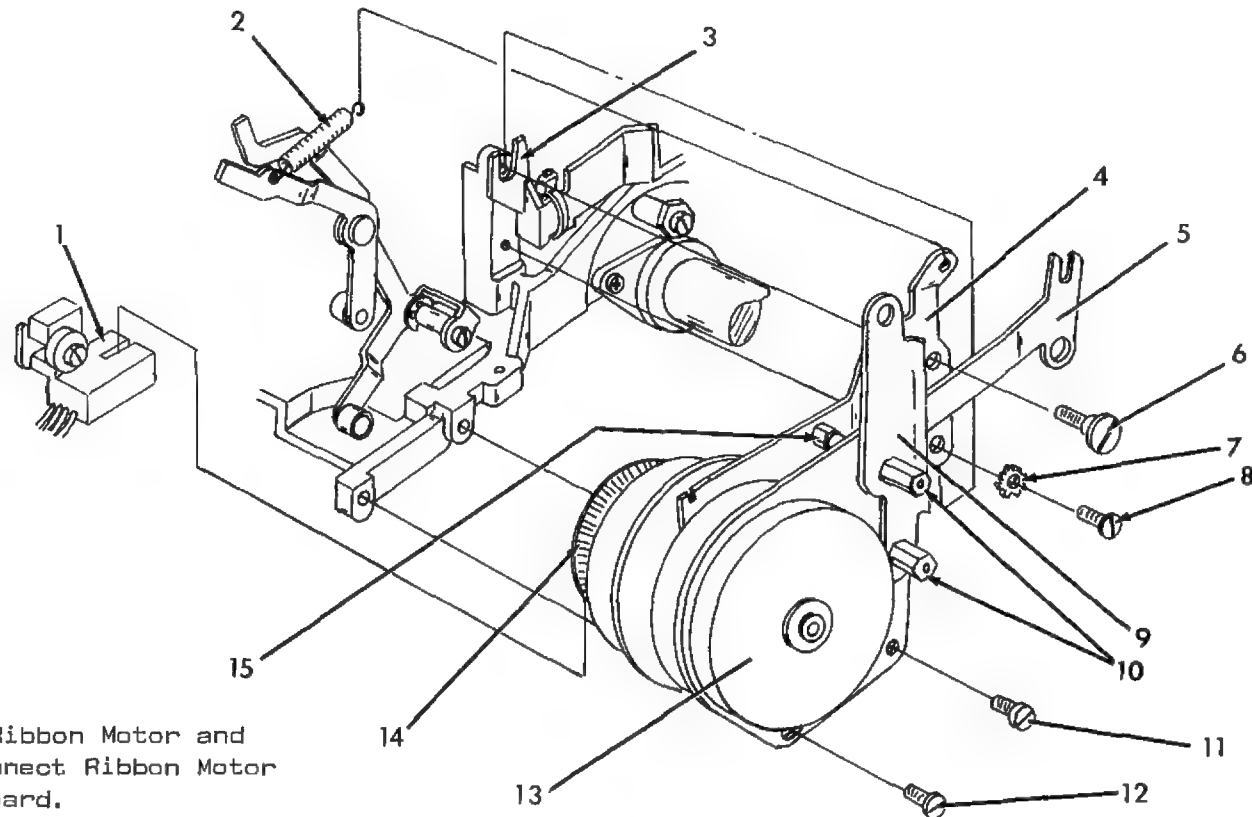
1. Remove Correction Ribbon; remove Casing Top, Mask, and Carrier Jacket (see Jacket Removal).
2. Remove E-RING (10) and WASHER (9).
3. Unhook SPRING (8).
4. Manually rotate Ribbon Motor Rotor top rearward to end of Correction Ribbon Lift cycle.
5. Lift CORRECTION RIBBON MECHANISM (11) out to the right.

REPLACEMENT: Reverse procedure.

ADJUSTMENTS BROKEN: None.



RIBBON MOTOR REMOVAL



RIBBON MOTOR REMOVAL

1. Remove Cartridge Rocker and Correction Ribbon mechanism.
2. Cut all Cable Ties between Ribbon Motor and Carrier PC Board, and disconnect Ribbon Motor Connector from Carrier PC Board.
3. Unhook SPRING (2).
4. Remove SCREWS (6), (8), (11), and (12), and LOCK WASHER (7). **NOTE:** Rotate Ribbon Motor Rotor to raise or lower CORRECTION RIBBON LIFT ARM (5) to gain access to SCREWS (6) & (8).
5. Move RIBBON MOTOR (13) slightly rearward and lift Motor and attached components straight up to remove.
CAUTION: Take care not to damage RIBBON CAM ENCODER (14) when disengaging from OPTICAL SENSOR (1).
NOTE: If installing a new Ribbon Motor, also remove NUTS (10), ROCKER BRACKET (9), SCREW (15), and MOTOR MOUNT BRACKET (4).

REPLACEMENT: Reverse procedure. **NOTE:** When reassembling, place MOTOR MOUNT BRACKET (4) between WIRING GUIDE FORK (3) and Carrier Motor Casting. Install SCREW (11) first, SCREW (12) next, and then all subsequent components.

ADJUSTMENTS BROKEN: None.

NOTE: If installing a new Ribbon Motor Assembly or a new Cam/Encoder Assembly, make all Cartridge Ribbon Adjustments except #6 and #7.

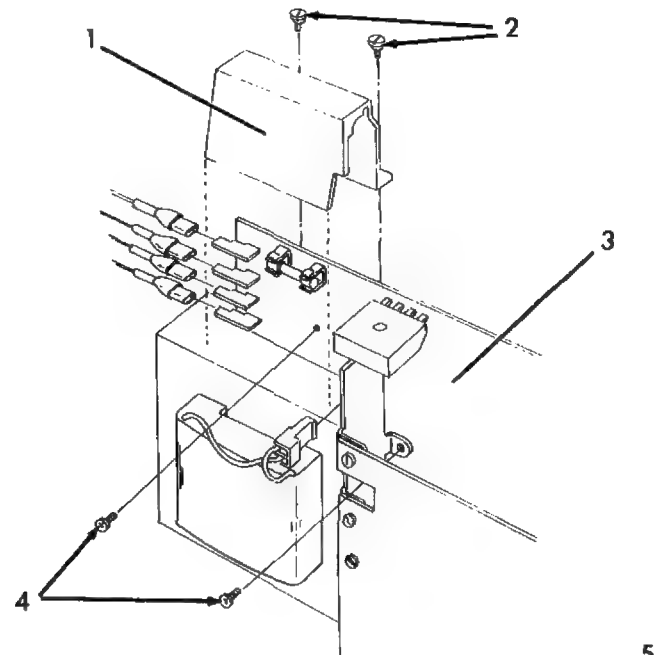
DRIVER/ELECTRONICS BOARD REMOVAL

CAUTION: OBSERVE ALL ANTI-STATIC PRECAUTIONS WHEN REMOVING AND REPLACING DRIVER/ELECTRONICS BOARD

1. Remove machine Jackets (see Jacket Removal).
2. Remove two SCREWS (2) and lift off FUSE COVER (1).
3. Disconnect all Connectors from DRIVER/ELECTRONICS BOARD (3).
4. Remove four SCREWS (4) that attach BOARD (3) to Upper Transformer Bracket (only two SCREWS (4) illustrated).
5. Snap BOARD (3) off three Plastic Standoffs on Lower Transformer Bracket and remove.

REPLACEMENT: Reverse procedure. Refer to Wiring Diagrams for Connector locations.

ADJUSTMENTS BROKEN: None.



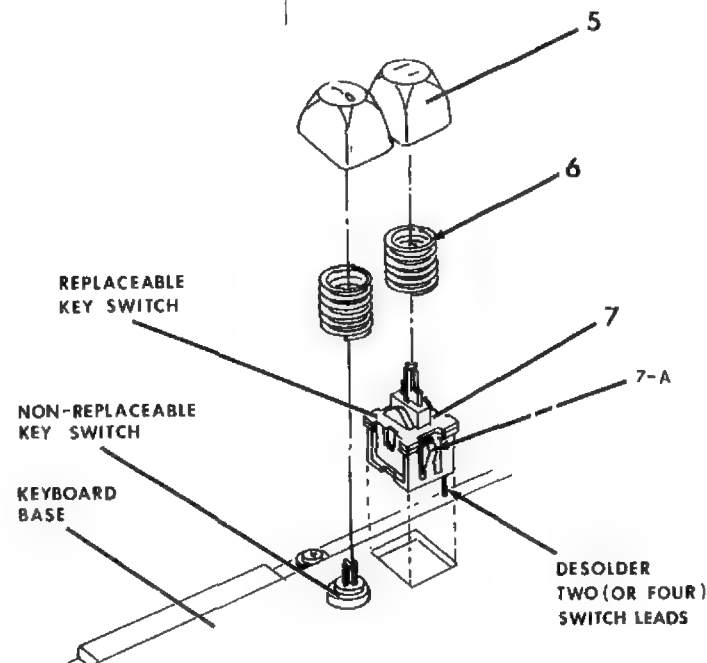
KEY SWITCH REMOVAL

NOTE: Not all Key Switches can be replaced. Refer to the appropriate Parts Manual for Switches which can be replaced.

1. Remove Keyboard Module (see Keyboard Module Removal).
2. Remove KEYBUTTON (5) and SPRING (6). **NOTE:** Not all replaceable Key Switches use SPRING (6).
3. Turn Keyboard upside down for access to Keyboard PC Board. De-solder two (or four) Switch solder points.
4. Turn Keyboard right side up. Press in on two LOCKING TABS (7-A) and remove KEY SWITCH (7).

REPLACEMENT: Reverse procedure. Check Key Switch function before installing Keyboard Module in machine.

ADJUSTMENTS BROKEN: None.



SOLENOID AND OPTICAL SENSORS REMOVAL

Remove Jackets and all mechanisms necessary to gain clearance to component to be removed (see Removals Index).

To Remove Component and Wire Connector:

1. Disconnect Component's Wire Connector from Carrier PC Board.
2. Cut all Cable Ties between Component and Carrier PC Board.
3. Remove Mounting Screws and Component. (NOTE: Also, unhook Spring to remove Element Optical Sensor).

REPLACEMENT: Reverse procedure. Refer to Wire Routing diagrams for location of Cable Ties.

ADJUSTMENTS BROKEN: Refer to the appropriate section of the Service Manual to make adjustments on the new Solenoid or Optical Sensor.

To Remove Component Only:

1. Cut the Component's Wire Leads at least 1" from Component.
2. Remove Mounting Screws and Component. (NOTE: Also, unhook Spring to remove Element Optical Sensor).

REPLACEMENT:

1. Mount new Component with Mounting Screws.
2. Strip 1/4" of insulation from all Leads of new Component and from cut Leads still in Wiring Harness.
3. Place 1/2" length of Shrink Tubing over Wiring Harness Leads.
4. Match colored Leads of new Component with colored Wiring Harness Leads, and twist Leads together.
5. Solder the twisted Leads.
6. Move Shrink Tubing over soldered Leads, and heat the Tubing so that it shrinks over each connection.
7. Check the continuity of new Solenoid connections with an Ohmmeter; use Electronic Voltmeter to check Optical Sensors--see PC Board Component Diagram for test points.
8. Reassemble remaining parts.

ADJUSTMENTS BROKEN: Refer to the appropriate section of the Service Manual to make adjustments on the new Solenoid or Optical Sensor.

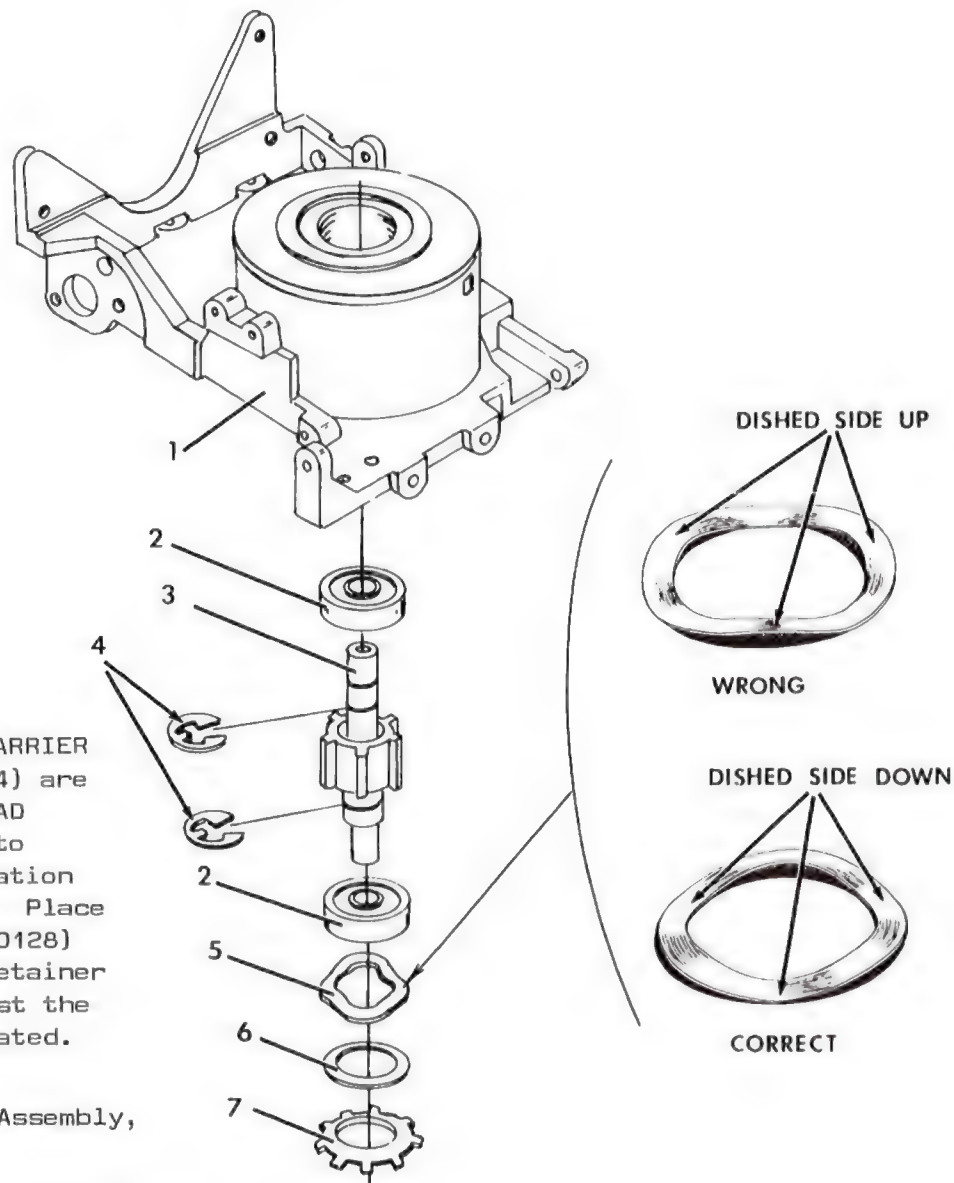
CARRIER MOTOR ROTOR AND BEARING REMOVAL

1. Remove Carrier Module, Carrier Optical Sensor, Encoder Driver Gear Assembly, and Capstan Gear (see Removals Index).
2. Use a flat blade screwdriver or springhook to pry out RETAINER (7) (carefully to prevent damage). Remove SPACER (6), PRELOAD SPRING (5), ROTOR ASSEMBLY (3), and BEARINGS (2) from CARRIER MOTOR (1).
3. Remove BEARINGS (2) from ROTOR SHAFT (3) with a Bearing Puller or other suitable tool. Take care not to damage Bearings or Rotor Shaft.

REPLACEMENT:

- A. Reassemble BEARINGS (2) onto ROTOR ASSEMBLY (3), with a 5/16" deep well socket or other suitable tool to apply an even pressure on the Bearing face.
- B. Reinstall Rotor and Bearing Assembly into CARRIER MOTOR HOUSING (1). Make sure the E-RINGS (4) are in place on the Rotor. Reinstall the PRELOAD SPRING (5), SPACER (6), and RETAINER (7) into CARRIER MOTOR HOUSING (1) (refer to illustration for proper installation of Preload Spring). Place Carrier Bearing Retainer Insertion Tool (250128) over Rotor Shaft and press it against the Retainer just until the Insertion Tool bottoms against the Rotor Shaft and the Retainer is properly seated. **CAUTION:** Do not use excessive force.
- C. Reinstall Capstan Gear, Encoder Drive Gear Assembly, and Carrier Optical Sensor.

ADJUSTMENTS BROKEN: Carrier Drive Adjustments #2, #3, & #5.



SECTION 13

SERVICE TESTING PROCEDURES

CONTENTS

- 13A. GENERAL PROCEDURES
- 13B. JUMPER WIRE PROCEDURE FOR
ENERGIZING COMPONENTS

GENERAL PROCEDURES

SELF TEST MODE

Entering the Self Test Mode causes the typewriter to print out a test pattern which will continue until power is turned off.

To enter the Self Test Mode, hold the Code key depressed while turning power on. NOTE: The typewriter prints in the pitch selected before power up.

STALL ANALYSIS MODE

The machine is equipped with a Stall Recovery program that prevents interruptions in typing when irregularities in motor movements are sensed. When there is no Shunt Connector connected to PC Board Post Header J16, the Carrier, Element, or Ribbon Motor reinitializes when an irregularity is sensed by the electronics. Characters entered from the keyboard are stored in memory during this initialization to provide uninterrupted typing to the user.

Should the amount of "stall recoveries" become excessive, the Stall Recovery program can be disabled, and Electronics will enter the Stall Analysis Mode. In this mode, an irregularity in motor movement will cause a stall, and the Preset and Program LED's will indicate the type of stall that occurred (see chart).

To enter the Stall Analysis Mode, turn power off and install a Shunt Connector on Post Header J16 on Driver/Electronics Board (refer to Wiring Diagrams). Operate the machine either through the Keyboard or in the Self Test Mode. The LED's alternately flash after initialization to indicate that the machine is in the Stall Analysis Mode. When a stall occurs, observe the LED's and analyze the type of stall according to the following chart:

<u>TYPE OF STALL</u>	<u>PRESET (YELLOW) LED</u>	<u>PROGRAMMED (RED) LED</u>
Carrier Debounce	OFF	FLASHING
Carrier	OFF	OFF
Element	OFF	ON
Element Home	ON	OFF
Ribbon	ON	ON

After service, turn power off and remove the Shunt Connector from J16.

HAMMER PICO FUSE

There is a 5 Amp Pico Fuse (component F-2 on Driver/Electronics Board) that protects the Hammer Circuit. If the Hammer fails to actuate, check continuity across the Fuse. If the Fuse is good, troubleshoot the Hammer Circuit. If the Fuse is blown, remove the Driver/Electronics Board, desolder the blown Fuse, and solder a good Fuse in its place.

JUMPER WIRE METHOD FOR ENERGIZING COMPONENTS

INTRODUCTION

The jumper wire method can be used to service Smith-Corona Electronic Multipitch Portable Typewriters. This method permits energizing windings to make the machine adjustments and to help diagnose problems. Careful adherence to instructions are required since seemingly minor mistakes can result in component damage.

The procedures that follow show how to energize various components of the Multipitch Typewriter. Motors and solenoids are energized through the Driver/Electronics Board, using jumper wires to draw current through machine circuits. Output voltages of Optical Sensors are checked at points on the PC Board with an electronic volt/ohmmeter. Machine adjustments can be performed by electrically energizing different components, often at the same time. Also, problems can be analyzed by troubleshooting apparent performance defects in the hardware and determining when the problem must be in the electronics.

One thing to keep in mind is that this method is useful for making adjustments and troubleshooting failures. For intermittent or difficult problems, carefully substitute modules--electronics, carriers, power supplies, ribbon cables, etc., to isolate the problem.

CAUTION: If mistakes are made when performing the procedures indicated on the following pages (that is, if Test Jumpers are connected to the wrong component or the wrong side of a component) Board damage or Solenoid damage is likely to occur.

REQUIRED TOOLS

- Test Jumpers with insulated connectors (at least four).
- 16 Pin DIP Clip (at least two).
- An Electronic Volt/Ohmmeter (preferably digital) with a resolution of 1mV DC and a DC Voltage accuracy of ±0.8% or better.

BASIC TEST PROCEDURE

1. Power and Disabling Initialization: To prevent the machine from initializing, remove Shunt Connector P12 and install a jumper between Pin 2 of J12, and right side of R30 (see Service Testing Points Diagram). Power up the unit to energize Motors and Solenoids and to read output voltages of Optical Sensors on the Driver/Electronics Board.

If the fuse blows, preventing the Driver/Electronics Board from remaining powered, disconnect the Transformer Connector from terminal J-7 on the Driver/Electronics Board. Also, remove the Carrier Connector from output terminal J-1 and Linespace Motor Connector from output terminal J-4.

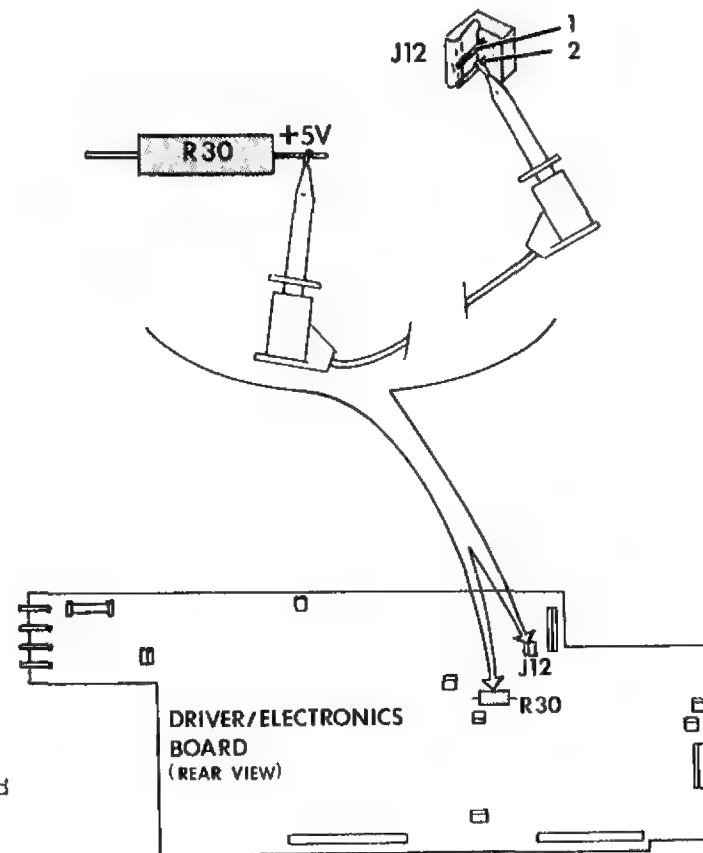
With connectors so removed, turn power on (for at least one minute). If fuse blows, a short is indicated in the power circuit. If it does not blow, power down, and reconnect the Transformer. Turn power on. If fuse blows, a short is indicated on the Printed Circuit Board. If it does not blow, follow similar procedure by powering down and one at a time connecting Carrier and Linespace connectors. If fuse blows when power is turned on, troubleshoot a short in the circuit(s) just connected.

Always turn power off before making or breaking connections. Board component damage can result if power in on while making or breaking connections to the input and output terminals of the Board.

Always make sure that machine is plugged into a grounded receptacle, and that the machine's grounding system is fully operative--make sure that the Screws that ground Boards to the Frame are tight.

DISABLE INITIALIZATION

1. REMOVE P12 FROM J12
2. INSTALL JUMPER AS SHOWN



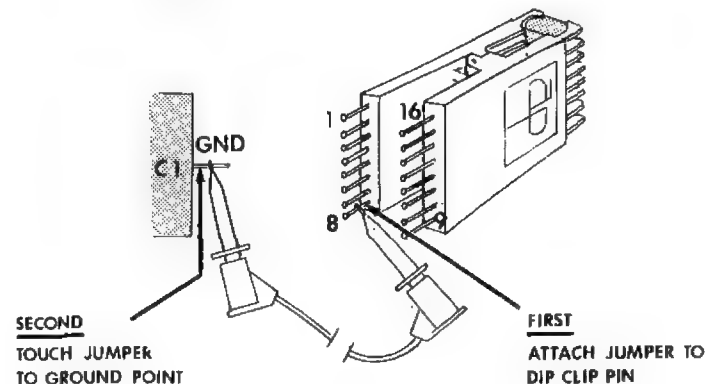
2. Energize Motors and Solenoids: Install Test Jumpers as indicated on Service Testing Points Diagram on page 13B-4 for each specific function. For functions on U11, U12, U13 or U14, install a 16 Pin DIP Clip to avoid shorting pins on the IC. Since a DIP Clip will not fit on U15, exercise extreme caution when energizing functions on U15. Always connect one side of the Jumper to the designated IC or DIP Clip Pin on the Driver/Electronics Board first. Then energize the Motor or Solenoid by touching the other side of the Jumper to ground end of Capacitor C1. An alternative to touching Capacitor is to touch the Heat Sink of the Driver/Electronics Board, which is also connected to ground. Unless otherwise noted, do not energize a component for more than one minute at a time. Disconnect and allow components to cool before re-energizing. To Sequentially energize Motor Phase Windings, refer to page 13B-7 for Alternate Service Testing Points.

CAUTION: Always connect to the component on the side shown in the illustration. Connecting to the wrong side will likely cause electrical/electronic failure.

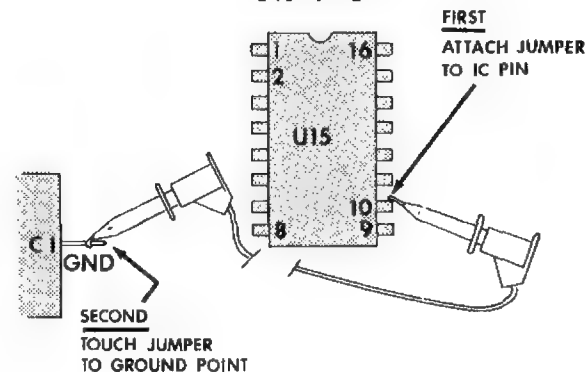
Troubleshooting Approach: If the Solenoid or Motor does not energize, use an ohmmeter to check circuit continuity between the Driver/Electronics Board and the Motors and Solenoids (including Cables). Determine whether the device or the wiring and/or connections are at fault, and repair as necessary. If the circuit checks okay, suspect the Driver/Electronics Board as the cause of the problem.

3. Output Voltages of Optical Sensors: Use a voltmeter to determine output voltage of the machine's Optical Sensors as indicated in the text.

U11, U12, U13, & U14
INSTALL DIP CLIP TO
ENERGIZE MOTORS &
SOLENOIDS



U15 ONLY



USE DIP CLIP

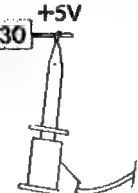
SERVICE TESTING POINTS

DISABLE INITIALIZATION

1. REMOVE P12 FROM J12
2. INSTALL JUMPER AS SHOWN

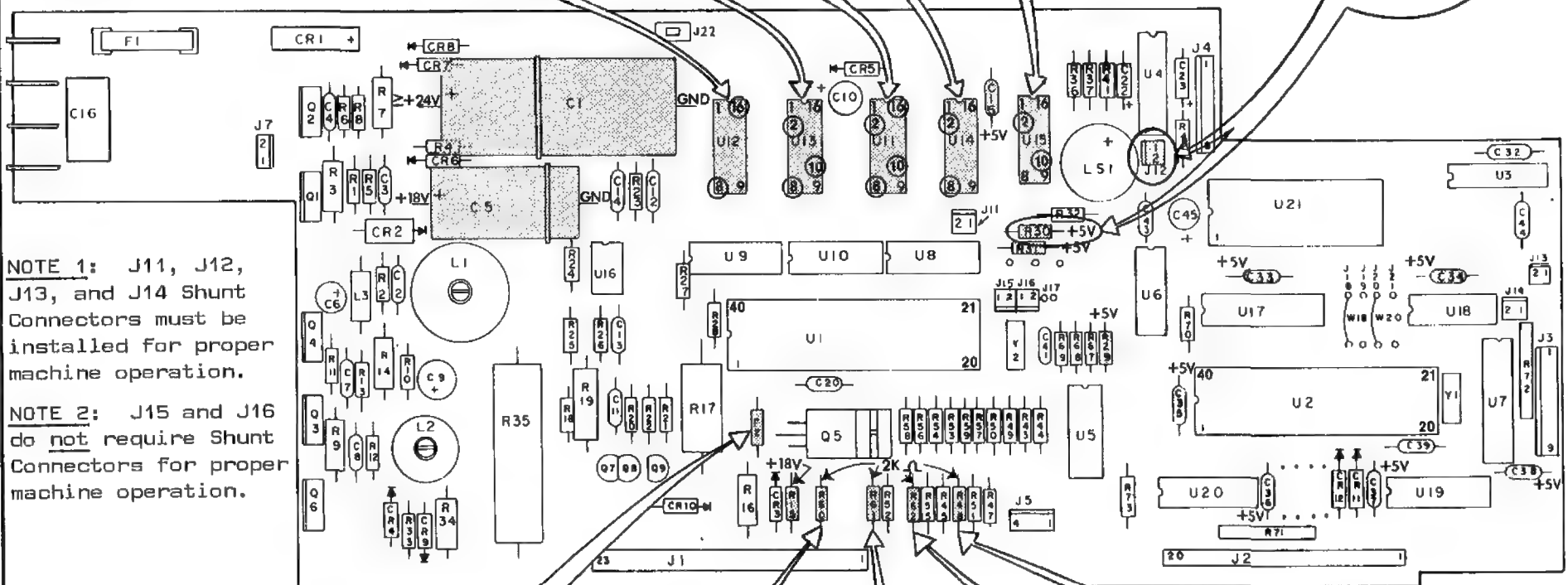


+5V
R30



- U12**
PIN 8 - ELEMENT MOTOR PHASE 1
PIN 16 - ELEMENT MOTOR PHASE 3
- U13**
PIN 2 - CARRIER MOTOR PHASE 2
PIN 8 - ELEMENT MOTOR PHASE 2
PIN 10 - ELEMENT MOTOR PHASE 4
- U11**
PIN 8 - LINESPACE MOTOR
- U14**
PIN 2 - CARRIER MOTOR PHASE 4
PIN 8 - CARRIER MOTOR PHASE 3
- U15**
PIN 2 - ELEMENT DETENT SOLENOID
PIN 10 - CARRIER MOTOR PHASE 1

FOR RIBBON MOTOR, SEE PAGE 13B-5.



NOTE 1: J11, J12, J13, and J14 Shunt Connectors must be installed for proper machine operation.

NOTE 2: J15 and J16 do not require Shunt Connectors for proper machine operation.

- REPLACEABLE HAMMER PICO FUSE F2 (5 AMPERE)
- CARRIER OPTICAL SENSOR
- ELEMENT OPTICAL SENSOR
- ELEMENT HOME OPTICAL SENSOR
- RIBBON OPTICAL SENSOR

OBSERVE ALL RULES OF THE BASIC TEST PROCEDURE

Disable Initialization: Remove Shunt Connector P-12 from J-12. Connect Jumper to right side of R30 and to Pin 2 of J-12.

Linsepac: Connect one side of Test Jumper to U11, Pin 8. Momentarily touch other side of Jumper to ground side of C1. Linsepac Motor should energize and cause a single Linespace stroke. Do not energize for more than one second.

Hammer Solenoid: The Hammer Solenoid cannot be safely energized without damage to the Hammer Pico Fuse (F2) or related components.

Element Detent Solenoid: Connect one side of Test Jumper to U15, Pin 2. Touch or connect other side of Jumper to ground side of C1. Element Detent Solenoid should energize, and Element Detent should close against Solenoid Poles.

Carrier and Element Motor Phase Windings: Connect one side of the Test Jumper to the applicable IC Pin listed below. Touch or connect the other side of the Jumper to ground side of C1. The applicable phase winding should energize. Sequential energizing of phase windings should rotate the Motor Rotor.

<u>CARRIER MOTOR</u>	<u>IC</u>	<u>PIN</u>	<u>ELEMENT MOTOR</u>	<u>IC</u>	<u>PIN</u>
Phase 1	U15	10	Phase 1	U12	8
Phase 2	U13	2	Phase 2	U13	8
Phase 3	U14	8	Phase 3	U12	16
Phase 4	U14	2	Phase 4	U13	10

Ribbon Motor Phase Windings: The Ribbon Motor must be energized on the Element Motor Circuit. Disconnect P202-2 (Element Motor Connector) from the Carrier PC Board. Disconnect P201-5 (Ribbon Motor Connector) from J201, Pins 18-21 and move to J202, Pins 3-6.

Connect one side of the Test Jumper to the applicable IC Pin listed below. Touch or connect the other side of jumper to ground side of C1. The applicable phase winding should energize. Sequential energizing of phase windings should rotate the Motor Rotor.

	<u>RIBBON MOTOR</u>	<u>IC</u>	<u>PIN</u>
ENERGIZED ON ELEMENT MOTOR CIRCUIT	Phase 1	U12	8
	Phase 2	U13	8
	Phase 3	U12	16

NOTE: After servicing, return connectors P201-5 and P202-2 to their proper locations.

DETERMINING OUTPUT VOLTAGE OF OPTICAL SENSORS

Use a Voltmeter to read output voltages of the machine's Optical Sensors. Attach the positive probe of the meter to the bottom of the applicable resistor listed below. Connect the common probe to ground side of capacitor C1.

Carrier Optical Sensor	Resistor R-60
Element Optical Sensor	Resistor R-61
Element Home Optical Sensor	Resistor R-62
Ribbon Optical Sensor	Resistor R-48

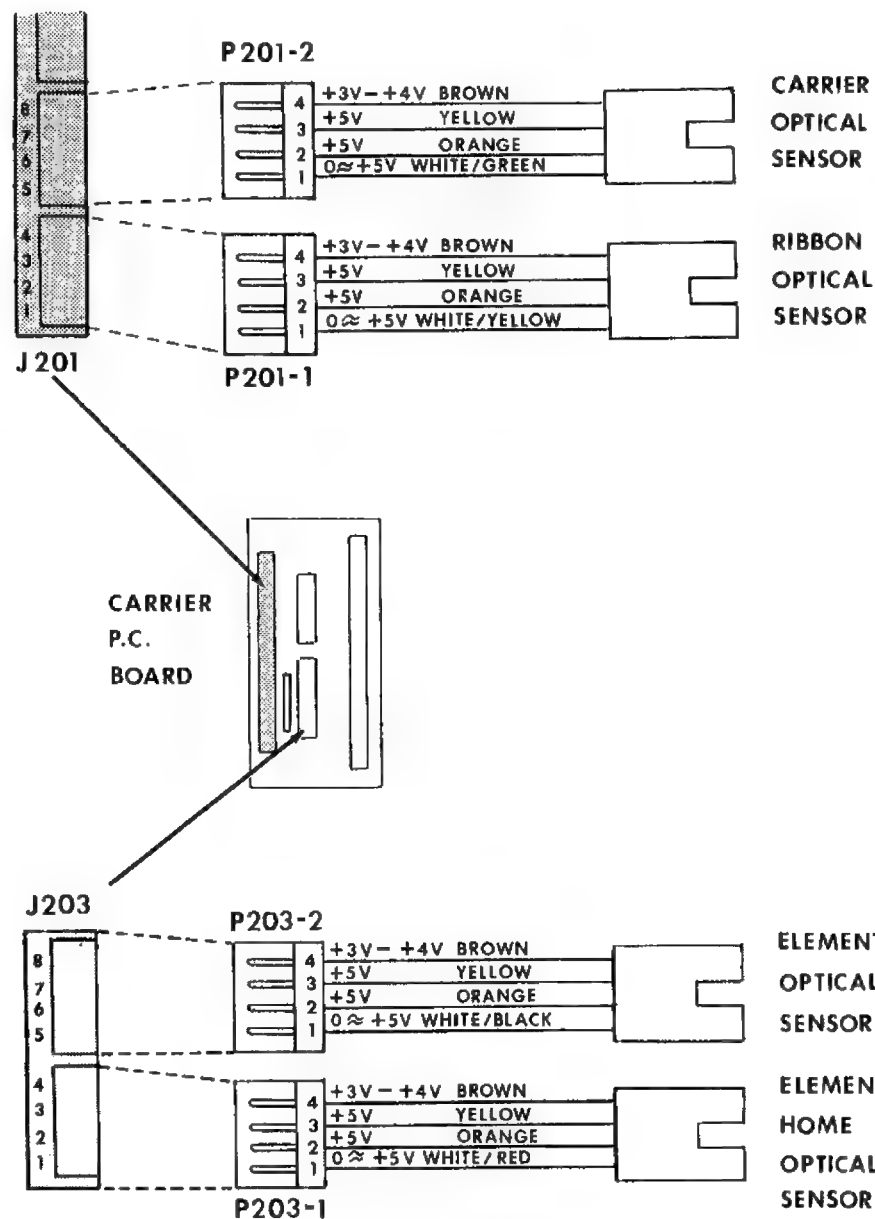
When checking for lowest possible voltage, select the Voltmeter range that provides millivolt readings. When checking maximum output of the sensor, select the range that provides readings up to five volts.

Troubleshooting:

Check voltage levels indicated at right at different points of the Sensor's circuit.

Alternative: Substitute a good Sensor at J201 or J203 on Carrier PC Board. Use a piece of paper to block light from the LED in Sensor to see that output voltage goes down.

NOTE: All sensors are the same electrically. Different part numbers reflect different housings.



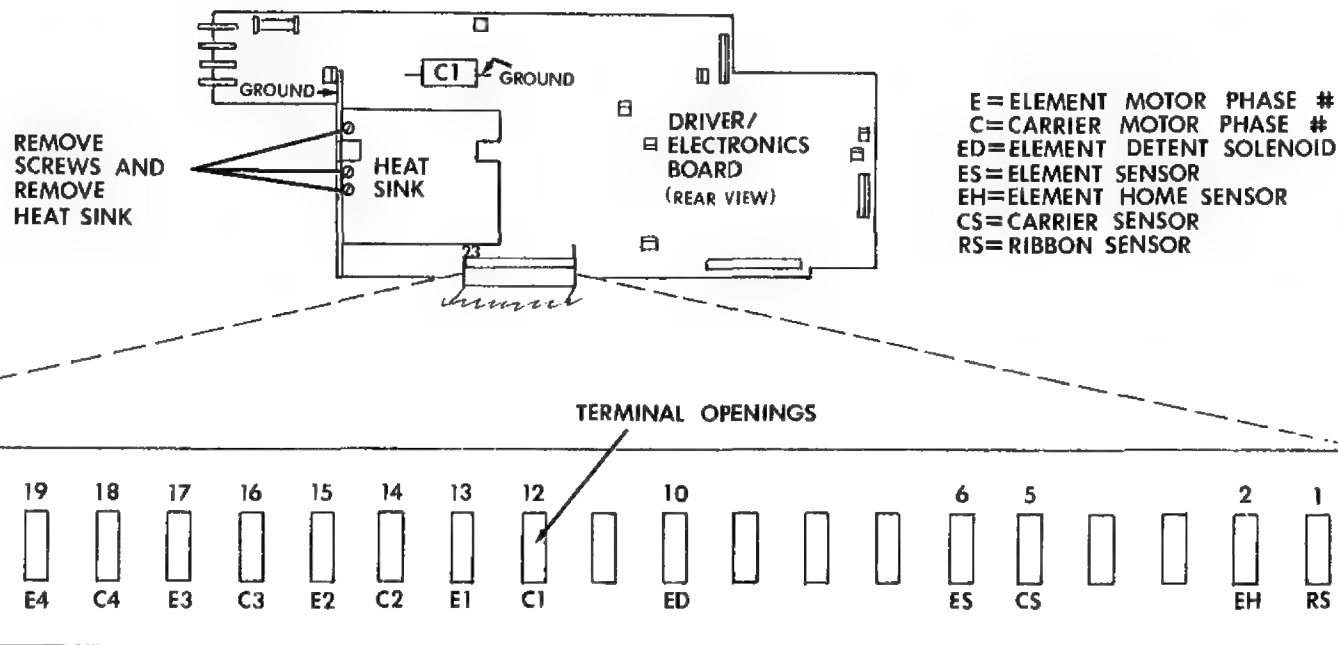
ALTERNATE SERVICE TESTING POINTS

The flexcable connection to the PC Board provides an alternate set of test points, which is particularly useful for energizing components momentarily (i.e. sequential energizing of motor phase windings.)

To Use These Test Points:

- 1). As previously described, install Jumper to disable initialization.
- 2). Remove 3 Screws and remove Heat Sink for full access to P1.
- 3). Use a jumper wire with a hook at one end and a needle type probe at the other end. Attach the hook to a ground point such as the ground lead of capacitor C1, the Heat Sink Bracket, or the machine's frames.
- 4). Turn power on, and touch the needle type probe to the appropriate terminal opening in Connector P1 to energize the desired component. To read output of an Optical Sensor, touch the probe to the appropriate terminal. CAUTION: To prevent component damage do not make contact with any terminals other than those specified below.

NOTE: Ribbon Motor must be energized on the Element Motor Circuit (See instructions on page 13B-5).







SMITH-CORONA PRODUCT SERVICE
SCM CORPORATION

PUBLICATION BULLETIN

TO: Smith-Corona Technical Service & Training
Smith-Corona Regional Service Managers
Smith-Corona Service Locations
Smith-Corona Electronic Typewriter Dealers

DATE: October 3, 1983

SUBJECT: NEW AND REVISED PAGES FOR SERVICE MANUAL

PUBLICATION

ELECTRONIC MULTIPITCH
PORTABLE TYPEWRITER
SERVICE MANUAL, FORM 3-0668

Attached are new and revised pages for the Smith-Corona Electronic Multipitch Typewriters Service Manual. New pages have been added to provide instructions for use of the Service Diagnostic ROM. Other pages have been revised to update specifications. Insert these pages in the Manual according to the Placement Instructions below.

PLACEMENT INSTRUCTIONS

REMOVE & DISCARD		INSERT		REASON FOR CHANGE
PAGE #	REVISION DATE	PAGE #	REVISION DATE	
4-1	Original	4-1	10/83	Revised Adjustment Sequence for Left End Switch
4-7	Original	4-7	10/83	Changed Adjustment Specification for Left End Switch
12-12	Original	12-12	10/83	<u>IMPORTANT:</u> Notes use of Plastic Insulators in PC Board Removal
13-1	Original	13-1	10/83	Added Diagnostic ROM Instructions (13C) to Contents page
--	--	13C-1	Original	
--	--	THRU		Added Service Diagnostic ROM Instructions
--	--	13C-6		

NOTE: On revised pages, an arrow (→) indicates what is new.

KEEP THIS BULLETIN IN THE SERVICE MANUAL BINDER.

CARRIER DRIVE ADJUSTMENTS

1

2

3

4

5

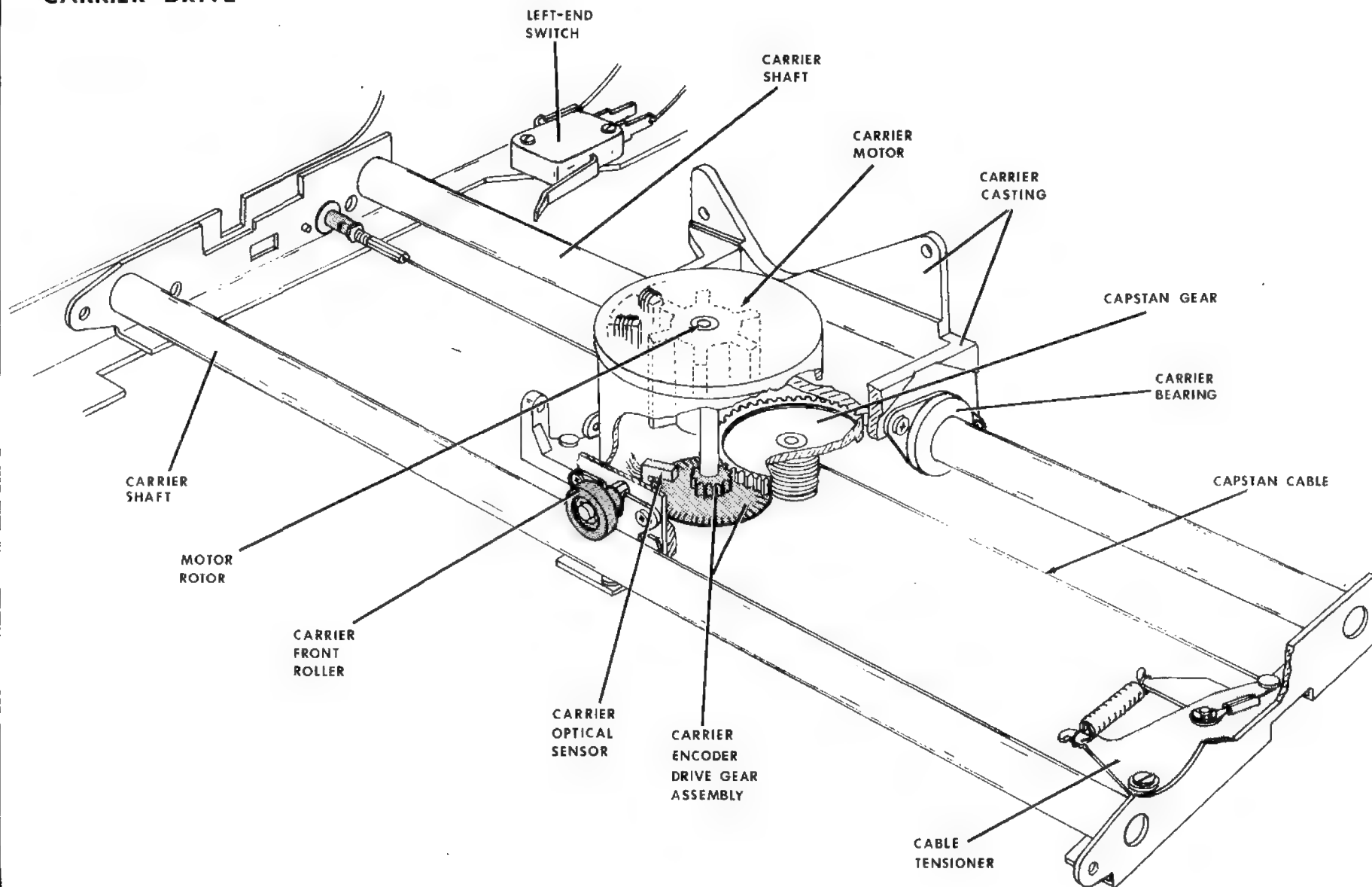
6

1. Carrier Front Roller Adjustment
2. Carrier Encoder-Drive Gear Alignment
3. Carrier Optical Sensor Alignment
4. Capstan Gear Bracket Adjustment
5. Capstan Cable Tension Adjustment
6. Left End Switch



Circled numbers in the illustrations indicate adjustment points.

CARRIER DRIVE



Left End Switch

REQUIREMENT:

When Left BOSS (2) of Carrier Casting is located approximately .125" from inside of Carrier Side Frame and Carrier Motor Phase 1 is energized:

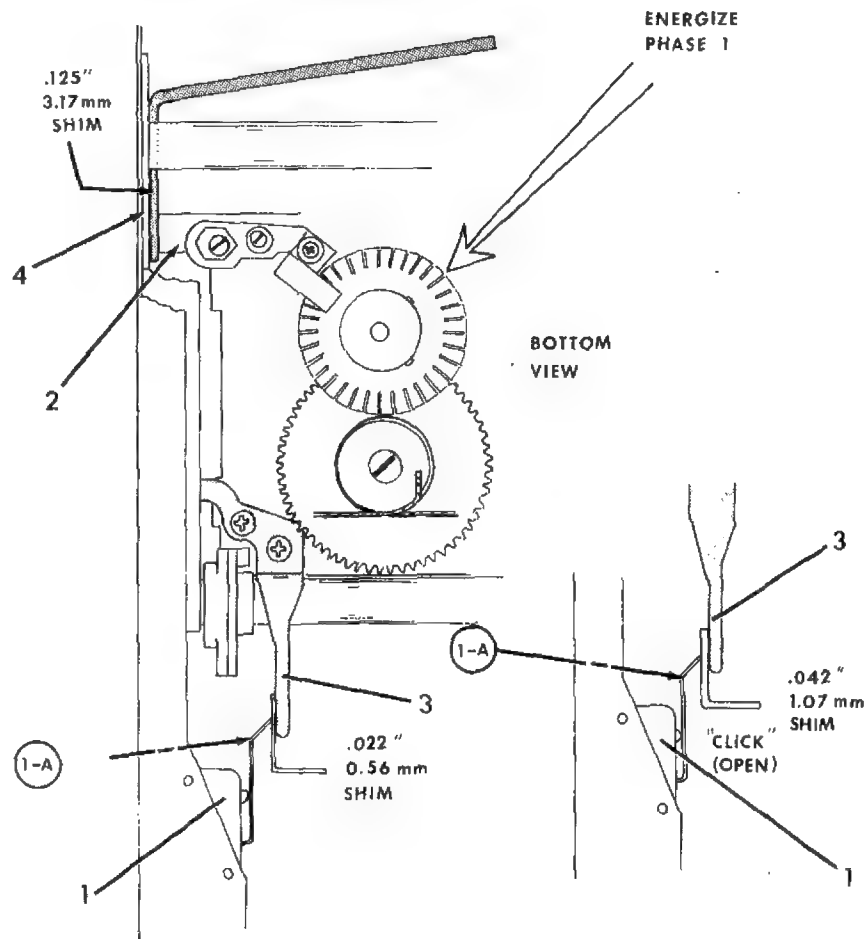
- A) Left End SWITCH (1) should be closed with a .022" Shim inserted between DOWN STOP ARM (3) and SWITCH ACTUATOR (1-A).
- B) Left End SWITCH (1) should be open with a .042" Shim inserted between DOWN STOP ARM (3) and SWITCH ACTUATOR (1-A).

TO CHECK: Insert a .125" Shim at inside of Carrier Side Frame and move Carrier Assembly until Shim is between SIDE FRAME (4) and BOSS (2) of the Carrier Casting. Remove Shim without moving Carrier Assembly. Energize Carrier Motor Phase 1 (extended time). Bias Carrier Assembly left or right until Carrier electrically moves into Phase 1 position. Check Left End Switch requirements.

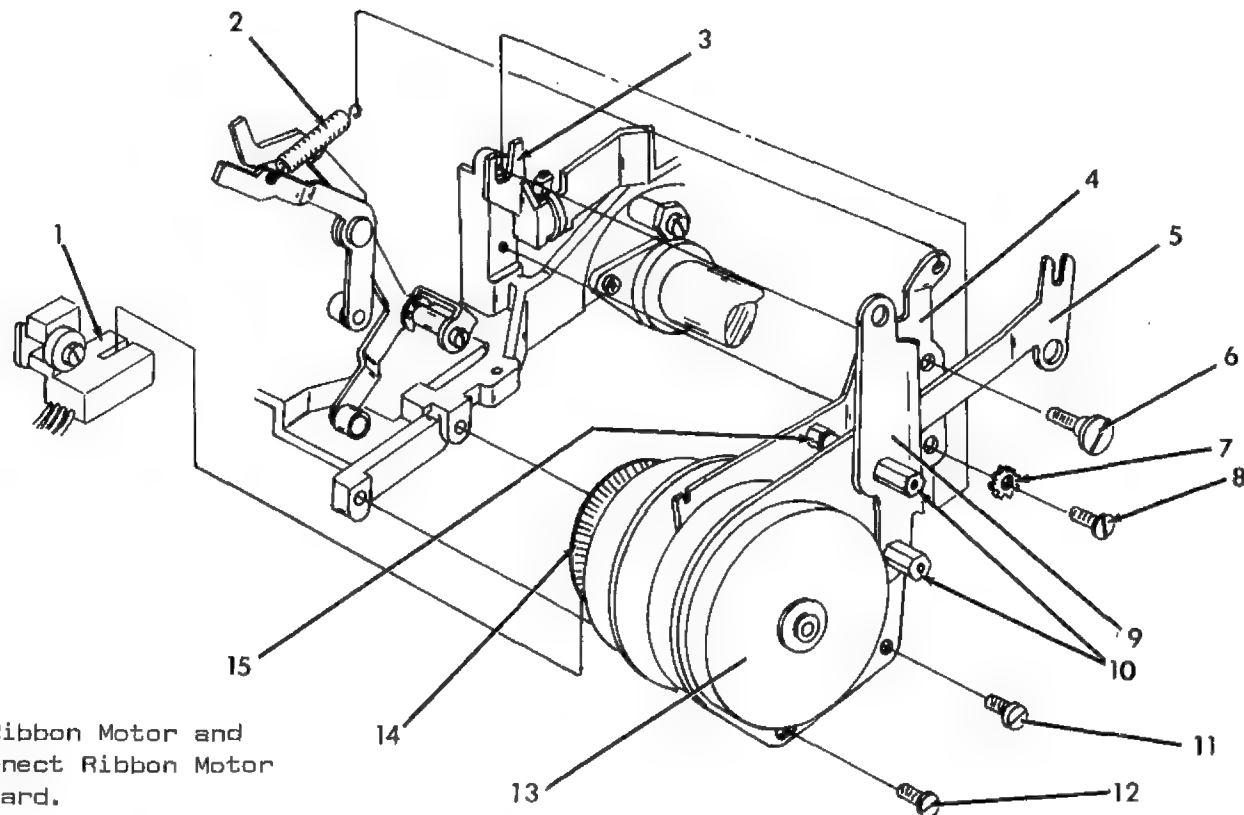
NOTE: If the Carrier chatters at the left end during initialization, or goes one extra space at extreme right end, remake adjustment with Carrier biased in the opposite direction.

ADJUSTMENT:

Form SWITCH ACTUATOR (1-A) left or right to meet requirements. Check that BRACKET ARM (3) is approximately centered on SWITCH ACTUATOR (1-A). If necessary, form BRACKET ARM (3) up or down.



RIBBON MOTOR REMOVAL



RIBBON MOTOR REMOVAL

1. Remove Cartridge Rocker and Correction Ribbon mechanism.
2. Cut all Cable Ties between Ribbon Motor and Carrier PC Board, and disconnect Ribbon Motor Connector from Carrier PC Board.
3. Unhook SPRING (2).
4. Remove SCREWS (6), (8), (11), and (12), and LOCK WASHER (7). **NOTE:** Rotate Ribbon Motor Rotor to raise or lower CORRECTION RIBBON LIFT ARM (5) to gain access to SCREWS (6) & (8).
5. Move RIBBON MOTOR (13) slightly rearward and lift Motor and attached components straight up to remove. **CAUTION:** Take care not to damage RIBBON CAM ENCODER (14) when disengaging from OPTICAL SENSOR (1). **NOTE:** If installing a new Ribbon Motor, also remove NUTS (10), ROCKER BRACKET (9), SCREW (15), and MOTOR MOUNT BRACKET (4).

REPLACEMENT: Reverse procedure. **NOTE:** When reassembling, place MOTOR MOUNT BRACKET (4) between WIRING GUIDE FORK (3) and Carrier Motor Casting. Install SCREW (11) first, SCREW (12) next, and then all subsequent components.

ADJUSTMENTS BROKEN: None.

NOTE: If installing a new Ribbon Motor Assembly or a new Cam/Encoder Assembly, make all Cartridge Ribbon Adjustments except #6 and #7.

DRIVER/ELECTRONICS BOARD REMOVAL

CAUTION: OBSERVE ALL ANTI-STATIC PRECAUTIONS WHEN REMOVING AND REPLACING DRIVER/ELECTRONICS BOARD

1. Remove machine Jackets (see Jacket Removal).
2. Remove two SCREWS (2) and lift off FUSE COVER (1).
3. Disconnect all Connectors from DRIVER/ELECTRONICS BOARD (3).
4. Remove four SCREWS (4) that attach BOARD (3) to Upper transformer Bracket. Remove three plastic INSULATOR CAPS (5) from Upper Bracket STAND-OFFS (6). **NOTE:** Only two SCREWS (4) and one INSULATOR CAP (5) are illustrated.
5. Snap BOARD (3) off three plastic Stand-Offs on Lower transformer Bracket and remove.

REPLACEMENT: Reverse procedure. Refer to Wiring Diagrams for Connector locations. Be sure three Insulator CAPS (5) are in place on Upper Bracket STAND-OFFS (6).

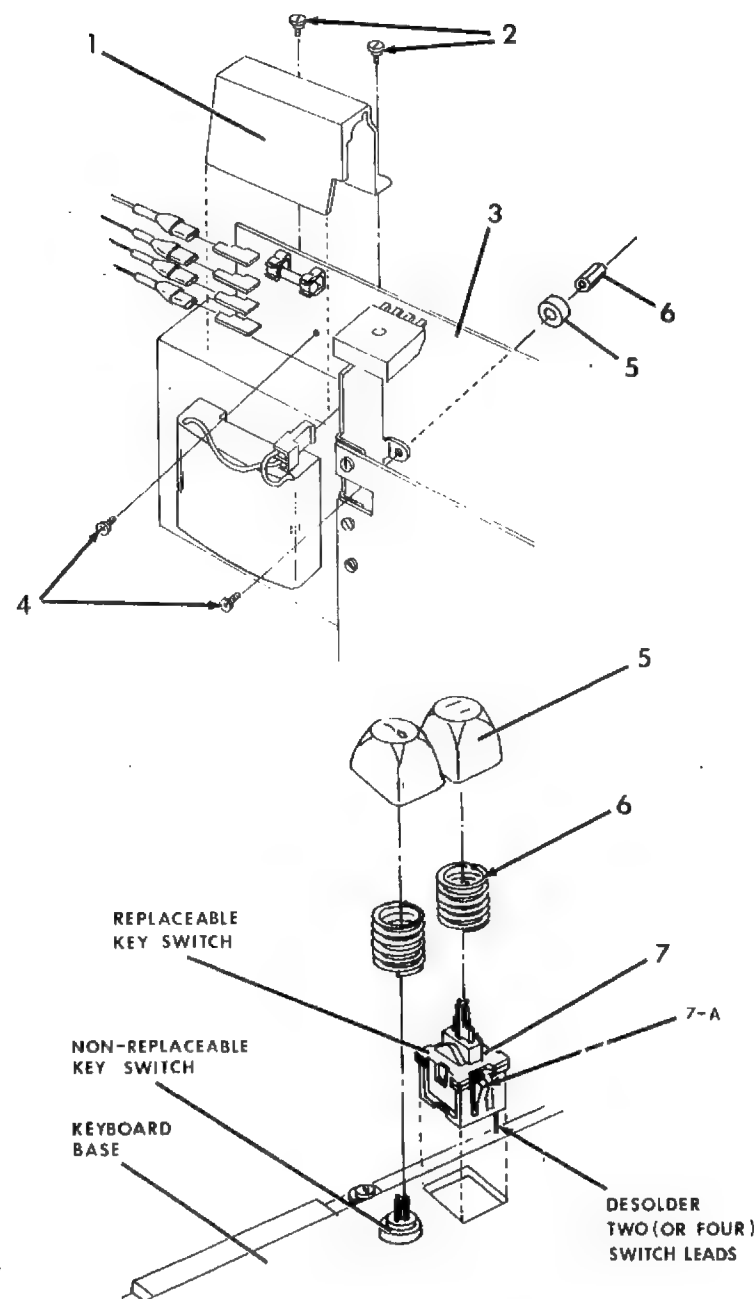
KEY SWITCH REMOVAL

NOTE: Not all Key Switches can be replaced. Refer to the appropriate Parts Manual for Switches which can be replaced.

1. Remove Keyboard Module (see Keyboard Module Removal).
2. Remove KEYBUTTON (5) and SPRING (6). **NOTE:** Not all replaceable Key Switches use SPRING (6).
3. Turn Keyboard upside down for access to Keyboard PC Board. De-solder two (or four) Switch solder points.
4. Turn Keyboard right side up. Press in on two LOCKING TABS (7-A) and remove KEY SWITCH (7).

REPLACEMENT: Reverse procedure. Check Key Switch Function before installing Keyboard Module in machine.

ADJUSTMENTS BROKEN: None.



SECTION 13

SERVICE TESTING PROCEDURES

CONTENTS

- 13A. GENERAL PROCEDURES
- 13B. JUMPER WIRE PROCEDURE FOR
ENERGIZING COMPONENTS
- 13C. SERVICE DIAGNOSTIC
ROM INSTRUCTIONS

SERVICE DIAGNOSTIC ROM INSTRUCTIONS

The Service diagnostic ROM (P/N 250129E) provides programs useful for checking various functions of the typewriter. To use it, the machine's ROM must be removed, and the Diagnostic ROM inserted. When the machine is powered up, programs are available to check Carrier and Element timing, Ribbon movement, and Keyboard. There is also a program to check the RO port (Messenger Input/Output Connector) on the typewriter. Finally, an automatic printout program causes the machine to print out all characters for 40 lines.

The service tools needed to use the Service Diagnostic ROM include the following:

<u>PART NUMBER</u>	<u>DESCRIPTION</u>
250129E	Diagnostic ROM
250135	Diagnostic LED Harness
250154	RO I/O Jumpered Connector
250155	Buffer Socket

Instructions for inserting the Diagnostic ROM and for performing the checks are on the following pages.

GENERAL NOTES:

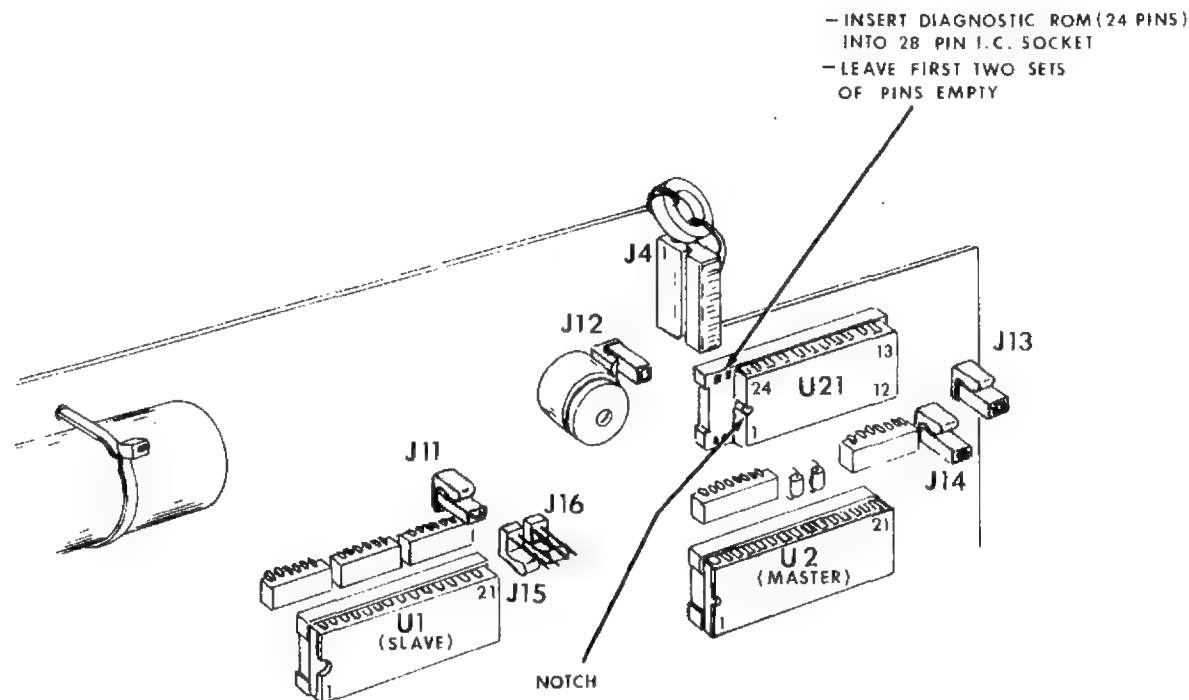
1. For static protection, insert ROM's into conductive foam when not in use. Also, touch the machine frames to dissipate any personal static charge prior to touching Driver/Electronics Board. See Service Bulletin on static sensitivity.
2. During the ROM's service checks, the machine's Red and Yellow LED's, if connected, flash in combinations that indicate conditions to the user. An alternate to the machine's LED's is the Diagnostic LED Harness (P/N 250135). To use the Harness, plug the 4 pin MTA Connector to Driver/Electronics Board J4, pins 3-6, with pin 1 of the Harness at pin 3 of J4.
3. A Buffer Socket (P/N 250155) should be used to increase the life of the machine's ROM Socket. Insert and leave Buffer Socket in machine's socket so the ROM's can be inserted and removed without damaging the machine socket. If buffer Socket deteriorates, it can be replaced, and the Driver/Electronics Board will not have to be sent in for repair.

ROM INSERTION

1. With the typewriter power cord unplugged, remove at least the Upper Casing Top.
2. Remove machine ROM U21.
3. The Service Diagnostic ROM is a twenty-four pin IC that plugs into the machine's twenty-eight pin ROM socket. Insert the Diagnostic ROM so the first two top and bottom pins on the left side of the socket are empty, and the notch of the ROM points to the left (see illustration). This leaves pins 1, 2, 27, and 28 of the socket open.

NOTE 1: Be sure Shunt Connectors are on Connectors J11, J12, J13, and J14 prior to power up. J15 does not require a Shunt Connector.

NOTE 2: A Shunt Connector can be installed on J16 for Stall Analysis, which is useful during the Automatic Printout.



POWER UP Indicators: Yellow LED - OFF Red LED - OFF

1. With ROM inserted, power up machine. Ribbon Motor should initialize, and Carrier should go to left end and stop.
2. During power up, the Keyboard is scanned and if any Keyswitch is closed, a Keyboard error is printed by the typewriter, indicating the Row, Column, Pitch, etc., of the closed Keyswitch.

NOTE: Information on one Keyswitch only is printed, even if more than one Keyswitch is closed. The ROM program is functional with a closed Keyswitch, but this is a warning that the Keyboard should be checked out.

MAIN MENU

After power up, the following programs can be started by depressing the Key indicated followed by the Return Key:

<u>DEPRESS</u>	<u>PROGRAM</u>	<u>NOTES</u>
C	Carrier Program	Performs Carrier Timing Check
E	Element Program	Performs Element Timing Check
R	Ribbon Program	Performs Ribbon mechanism movements
K	Keyboard Program	Checks and prints out status of each Keyswitch
M	RAM Check	Checks the Electronic's Random Access Memory
O	RO Port Check	Electronically checks Input/Output Data Lines and Electronic function of Messenger Receive Only Port Connector
V	Automatic Printout	Prints out all characters of the Print Element for 40 lines

The Return Key must be depressed to start any program or function of a program. To repeat the same function, depress only the Return Key.

NOTE 1: During any long test, the LED's flash.

NOTE 2: Depression of any Key (except Code, Lock, Shift) causes an audible chirp.

THE ROM PROGRAMSCARRIER PROGRAM (C) Indicators: Yellow LED - OFF Red LED - ONDEPRESSFUNCTION (Carrier Timing Check)NOTEST, Return
L, Return

--The Carrier moves 105, 126, 157 spaces (depending on pitch) to the right and then left. The electronics times each move, and the typewriter prints: "Time OK," or "Adj. CCW," or "Adj. CW."

--Dual pitch machines operate in 10 Pitch only.

--"CW" and "CCW" refer to the direction that the Carrier Optical Sensor eccentric should be rotated (as viewed from the bottom)--see Carrier Adj. #3.

--"Time OK" indicates both moves are balanced.

--Exit to Main Menu.

X

ELEMENT PROGRAM (E) Indicators: Yellow LED - ON Red LED - OFFDEPRESSFUNCTION (Element Timing Check)NOTEST, Return
L, Return

--The Element moves 48 positions counterclockwise and then clockwise. The electronics times each move, and the typewriter prints: "Time OK," or "Adj. CCW," or "Adj. CW."

--"CW" and "CCW" refer to the direction that the Element Optical Sensor Screw should be rotated--see Print Element Adj. #3.

--"Time OK" indicates both moves are balanced.

--Exit to Main Menu.

X

RIBBON PROGRAM (R) Indicators: Yellow LED - ON Red LED - ONDEPRESSFUNCTIONNOTES

C

--Correction Ribbon Lift and Home.

U

--Cartridge Ribbon Lift and Home

F

--Cartridge Ribbon Lift, Feed, and Home.

X

--Exit to Main Menu.

These moves are useful for analyzing Ribbon mechanism movements.

KEYBOARD PROGRAM (K) Indicators: Yellow LED - OFF Red LED - OFF

DEPRESS

FUNCTION

NOTES

Any Key
(except Code,
Lock, and
Shift)

--Displays Row, Column, and Pitch of the
depressed Key.

--See Keyboard Matrix
--Dual Pitch machines indicate 10 Pitch
only, and deep depression switches are
always open.
--If an invalid pitch setting is found
(both pitch bits low), an "INV" prints
in the pitch column of the Keyboard
program.

Code, Lock,
or Shift Key
and any other
Key

--Also displays switch status using the
following symbols:

DD = Deep Depression 1 = Switch closed
C = Codes Switch 0 = Switch open
S = Shift Switch
L = Shift Lock
KB = Keyboard

--The Shift LED reflects the status of the
Keyboard Switch ("On" when Keyboard
Switch is on or not connected--Triple
Pitch only).

X, Return

--Exit to Main Menu.

--Data for "X" is printed, but the "Return"
causes exit to main menu.

RAM CHECK (M) Indicators: Yellow LED - OFF Red LED - OFF

DEPRESS

FUNCTION

NOTES

M

--Indicates "RAM OK" or "RAM Failure."

--Dual Pitch: There is no RAM; this test
always indicates a failure.
--Return to Main Menu is automatic after
RAM check.

RO PORT CHECK (0) Indicators: Yellow LED - OFF Red LED - OFF

PROCEDURE: Install RO I/O Jumpered Connector (P/N 250154) on Messenger RO Output Connector.

<u>DEPRESS</u>	<u>FUNCTION</u>	<u>NOTES</u>
Alpha character "0" (and then Return).	--First check indicates "RO Port #1 OK," or "RO Port Failure."	--RO Port Failure indicates defective data line or electronic failure. Failure is always indicated on non-Messenger units.
Reverse Jumpered Connector; depress Return	--Second check indicates "RO Port #2 OK" or "RO Port Failure."	--Return to Main Menu is automatic after RO I/O check.

ADDITIONAL CHECK: When diagnosing RO Port problems, check Power Supply voltage and Ground as follows:

With Power "On," check for $\geq +24V$ between RO Connector pin 3 and PC Board ground. With Power "Off," check continuity between PC Board ground and RO Connector pins 1, 5, and 7.

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AUTOMATIC PRINTOUT (V) Indicators: Yellow LED - OFF Red LED - OFF

<u>DEPRESS</u>	<u>FUNCTION</u>	<u>NOTES</u>
V	--Prints out for 40 lines and then stops. (To stop printout, power down).	--Install Shunt Connector on J16 to analyze a stall during printout. --Select pitch prior to start-up. Prints in 10 Pitch only on Dual Pitch. --Allow machine to cool before starting another printout (6 minutes minimum).